QRS MUSIC TECHNOLOGIES, INC.

PMII Installation Manual

(51074)

QRS PNOmation II

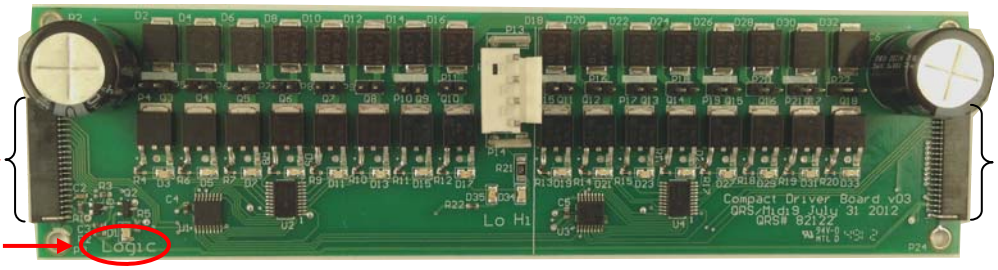
Manual Revision: September 24, 2013

The PMII unit MUST be within 30" of the Input Connector of the First Driver Board

New Driver Boards

INPUT
From PMII
DRIVER PORT A

"LOGIC" end of board is the INPUT



OUTPUT
To Input of Next Board

- Reduced size with the same drive capability
- Surface Mount Technology (SMT) design with flush trimmed leads where needed
- Special con-formal coating for high electrical insulating value
- Custom matching aluminum extrusion for safe easy mounting
- Smaller signal "ribbon" cable is less bulky
- New high speed FET components for improved performance
- LED for each key solenoid circuit for easier troubleshooting
  - LED's show signal to FET is good
  - If a solenoid is not moving but the associated LED is lighting, it's a solenoid or wire problem

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Introduction

QRS is pleased that you have chosen the QRS PNOmation II™ Retrofit Kit, the superb retrofit kit for automating acoustic pianos. This product brings a level of excellence in reproducing live performances on the piano. It is made possible by many remarkable technical innovations. However, in spite of its high level of sophistication, this retrofit kit is easy to install and service.

Before beginning the installation, take time to read "Make Certain the Kit Fits," to ensure that the piano will indeed accept the kit. *This kit will NOT fit into a spinet piano.* Familiarize yourself with the parts in the kit before proceeding and then let the instructions guide you.

All piano keys have a tendency to react differently. The key solenoids provide three adjustments: the first adjusts the amount of plunger throw to match that of the key-tail lift, the second sets the lost motion between the key tail and the plunger tip and the third adjusts the force of each key solenoid.

Although the kit has been provided with enough solenoids to play 80 notes, the instrument has been designed to support the entire 88-note range of the modern piano. The additional parts required may be purchased separately if an 88-note installation is desired.

The standard Pianomation kit comes with a pedal solenoid but will also run in magic pedal mode if the Pedal Solenoid is not present. The pedal solenoid is connected to the power supply by a 4 position plug. The Pedal Solenoid will activate the trapwork, therefore lifting the dampers off of the strings as a real pianist would. In "Magic Pedal Mode" the key solenoids control the sustain events by extending note durations to the corresponding pedal ON event.

The instrument uses relatively low voltages supplied by an isolation transformer. Low voltages eliminate the danger of electrical shock to the installer (Below UL limit of 41V). The electronics are fully shielded to prevent electromagnetic interference.

You will need some materials not provided with the kit to complete the installation.

Steinway grand pianos require special Sostenuto trapwork not supplied with the standard kit.
Order QRS part number 70897

Parts List

Grand Kit - Item #815002 [Without Record Option]

Item #2	Item #3	Item #4	QTY	Description
76040			1	QRS Amplified Speaker
81500			1	PMII Kit - Grand
	80124	8012406	1	PMII PLP x Pin Light Extension (PLx)
		50128	2	Cable: 1/8" Male to 1/8" Male - 6.5'
		50126	2	Cable: USB A Male to 5-Pin USB Mini B Male
		50141	1	Cable: USB A Male to USB B Male
		790185B	1	Cable: PNOscan extension ribbon, black - 72"
		5606433	4	Screw
	80108		1	PMII Processor Assembly [2 Brackets -80109 / Screws - 37322]
		80108S	1	PMII Processor
		990026	1	Cable: 1/8" Male to Twin RCA - 8'
	82122		5	NEW! 16-Note Driver Board
	82124		2	NEW! Aluminum Extrusion - *Driver Board Mounting* [70585 Screws x 6]
	75210			Power Supply Rev 2
	79226		1	QRS 32GB SD Card w/Music
	79232		1	Wi-Fi Device w/Power Adapter and Ethernet Cable
	82797		1	Owners Pack Out
		70388	4	AAA Batteries
		73398	1	PMII Big Button Remote
	71009		1	Split Loom Tubing
	71010		3	Clamp, R Cable (7/8" Black)
	70253		1	Owners Warranty Registration Card
	60205		1	Cable Package:
	82127		3	NEW! Driver Board Interconnecting Ribbon Cable - 4"
	82128		1	NEW! Driver Board Interconnecting Ribbon Cable - 14"
	82129		1	NEW! Processor to Driver Board Signal Ribbon Cable - 30"
		811437	1	Power Supply to Note Driver Power Cable
		811439	1	Processor to Power Supply Ribbon Cable 48"
		8115902	1	User Control Box Cable (Processor to FE 6')
		70263	1	Power Cord 3'
		70348	1	Extension Cord 8' Black
71500B			1	Rail & Components Assembly
		70050A	1	Note Rail Assembly-Grand (2 Rails & 80 Solenoids)
		70065	1	Solenoid Rail Cover
		70130	1	Pedal Solenoid Assembly
		70743	1	Universal Sostenuto Assembly (Steinway Sostenuto 70897 - Special Order)
		74270D	1	Sustain Trapwork Assembly REV D
		70083F	80	Key Solenoid Plungers 4.5" [Felt Tip] "No key-tail felt required"
	70400A		1	Small Parts Bag:
		70058	2	Dual Solenoid Mounting Plate
		70054	4	Rail Mounting Plate Bolt
		70056	4	Rail Mounting Plate Nut
		70062	8	Rail Mounting Bracket
		70078	8	Rail Bracket Mounting Screw 10/32 x5/16"
		70079	8	#10 Flat Washer
		70075	8	#10 External Star Lock Washer
		70080	38	#10 x 1" Screw
		70222	1	Left Soft Shift Bracket
		70224	1	Right Soft Shift Bracket
		70226	1	Axel Rod
		70228	1	Axel Rod lock Nut
		70236	2	Nylon Washer
		70204	10	Cable Tie
		70208	4	Ribbon Cable Clamp
		70218	8	Power Cord Clamp
		70129	16	1" Cable Clamp Screw
		70076	8	8/32 x 1/4" Bolt
		70190	4	Fender Washer
		70178	2	10/32 x 1/2" Screw

Parts List

Upright Kit - Item #815022 [Without Record Option]

Item #2	Item #3	Item #4	QTY	Description
76040			1	QRS Amplified Speaker *[Twin Speakers can be ordered for smaller pianos - # 76047]*
81502			**1**	**PMII Kit - Upright**
	80124	8012406	1	PMII PLP x Pin Light Extension (PLx)
		50128	2	Cable: 1/8" Male to 1/8" Male - 6.5'
		50126	2	Cable: USB A Male to 5-Pin USB Mini B Male
		50141	1	Cable: USB A Male to USB B Male
		790185B	1	Cable: PNOscan extension ribbon, black - 72"
		5606433	4	Screw
	80108		1	PMII Processor Assembly [2 Brackets -80109 / Screws - 37322]
		80108S	1	PMII Processor
		990026	1	Cable: 1/8" Male to Twin RCA - 8'
	82122		5	NEW! 16-Note Driver Board
	82124		2	NEW! Aluminum Extrusion - *Driver Board Mounting* [70585 Screws x 6]
	75210			Power Supply Rev 2
	79226		1	QRS 32GB SD Card w/Music
	79232		1	Wi-Fi Device w/Power Adapter and Ethernet Cable
	82797		1	Owners Pack Out
		70388	4	AAA Batteries
		73398	1	PMII Big Button Remote
	71009		1	Split Loom Tubing
	71010		3	Clamp, R Cable (7/8" Black)
	70253		1	Owners Warranty Registration Card
	60205		1	Cable Package:
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	82128		1	NEW! Driver Board Interconnecting Ribbon Cable - 14"
	82129		1	NEW! Processor to Driver Board Signal Ribbon Cable - 30"
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		811439	1	Processor to Power Supply Ribbon Cable 48"
		8115902	1	User Control Box Cable (Processor to FE 6')
		70263	1	Power Cord 3'
		70348	1	Extension Cord 8' Black
70051			**1**	**Rail & Components Assembly - Upright**
		70050A	1	Note Rail Assembly-Grand (2 Rails & 80 Solenoids)
		70074	**80**	**Foam - Lost Motion**
		51045	1	**Vertical Pedal Solenoid Lifter Assembly [*Includes Pedal Solenoid 70130*]**
		70083R	**80**	**Key Solenoid Plungers 4.5" [Rubber Tip]**
		70084	**1**	**Key Tail Felt 1'-1/16"**
	70400A		1	Small Parts Bag:
		70061	**80**	**Felt - Lost Motion - Upright**
		70058	2	Dual Solenoid Mounting Plate
		70054	4	Rail Mounting Plate Bolt
		70056	4	Rail Mounting Plate Nut
		70123	**8**	**Rail Mounting Bracket - Upright**
		70078	8	Rail Bracket Mounting Screw 10/32 x5/16"
		70079	8	#10 Flat Washer
		70075	8	#10 External Star Lock Washer
		70080	38	#10 x 1" Screw
		70222	1	Left Soft Shift Bracket
		70224	1	Right Soft Shift Bracket
		70226	1	Axel Rod
		70228	1	Axel Rod lock Nut
		70236	2	Nylon Washer
		70204	10	Cable Tie
		70208	4	Ribbon Cable Clamp
		70218	8	Power Cord Clamp
		70129	16	1" Cable Clamp Screw
		70076	8	8/32 x 1/4" Bolt
		70190	4	Fender Washer
		70178	2	10/32 x 1/2" Screw

Introduction

Make Certain that the Kit will Fit!

All kits play 80 notes, excluding the first and last 4 keys of the standard piano keyboard. The following questions should be asked before beginning an installation:

1. Is it a grand or upright piano? The kit will not fit into a spinet piano.

2. Is the keybed made of wood or a wood-veneered laminate?

3. Does the piano have a range of 88 notes, extending from low A to high C?

4. Is the keyframe made of wood?

5. Is the piano well-regulated and in good mechanical condition?.

6. Does the piano have sufficient space beneath the soundboard or inside an upright to mount the pedal solenoid & power supply (5.25" x 5.25" x 12.5")?

7. Can the back of the key frame be cut away 1 3/16"?

Tools Needed

Paper
Pencil
Measuring Tape
Long Straightedge
Adjustable Frame Square
Screwdriver (Assortment)
Power Screwdriver (Optional)
Socket (Assortment)
11/32” Nut Driver
5/16” Nut Driver
Hammer
Hacksaw
Metal File
Rasp
Utility Knife
Plastic Cutting Board
Wood Chisel
Awl
Wood Glue
Spray Paint (Black)
Sandpaper (Assortment)
Palm Sander (Optional)
Jig Saw
Jig Saw Blades (Assortment)
Power Drill (Right Angle Optional)
Drill Bits (Assortment)
1-3/4” Forstner Bit or Flat (paddle) Bit
Center Punch
Circular Saw - 7 1/2” blade (Optional)
Router (Optional)
Vacuum Cleaner

Introduction

Piano Action Regulation

This discussion is not intended to be a complete course on grand action regulation, but rather may prove helpful in restoring the action to proper performance. Proper alignment of action parts, and key easing are all very important steps in the regulation procedure. The following procedure assumes that this preliminary work has been checked and performed as necessary. Before removing the action from the action cavity, evaluate action regulation. If the action is not well regulated, proper performance of the system cannot be expected.

During the installation process of the PNOmation II Player System, it is quite possible that action regulation will be directly affected. A portion of the keyframe and back rail cloth will be removed so that the note solenoid plungers can contact the keytails. This operation may cause the keytails to be lower than their original position. The result of lower key tails is an increase in both key height, and hammer strike distance. Restoring the strike distance to specifications by turning out the capstan screws is not the proper remedy. Always re-work the back rail height so that the key height is at its original position.

- Are the keys level?
- Do the hammers let off 1/8 in the bass, tapering to 1/16 in the high treble?
- Is the drop 1/16 below the point of let-off?
- Is the hammer line straight?
- Are the hammer shanks approximately one shank thickness above the hammer rest rail?
- Is there adequate after-touch?

With the action on a flat, clean workbench, measure and record the following:
Natural key height at bass and treble ends.
Sharp height above naturals.
Key dip; both naturals and sharps.
The height of the first and last hammers in each section of the action.

Replace the keys and action stack on the action frame. Refer to the regulation measurements recorded earlier to see if regulation has been affected by the modifications to the action frame. If key height, key level, or strike distance are different than previously recorded, steps must be taken to restore proper regulation.

To restore key height, replace the back rail cloth with one of a thicker dimension. Remove the action stack and keys. After removing the old back rail cloth, be sure that all traces of glue have been removed from the back rail. Replace a few of the end keys and try various thickness of back rail cloth, without glue, to ball park the correct key height. Light finger pressure on the capstan screw will approximate the force that is normally on the capstan. Set key height with the back rail cloth at, or slightly below the desired key height.

When you are satisfied that you have the best choice of back rail cloth, glue the material to the back rail, leaving the rear edge unglued. Name board felt is available in a few different thicknesses, and can be used for fine adjustments when glued under the back rail cloth.

Although key height can be reestablished quite accurately using the above procedure, some key leveling is to be expected when replacing back rail cloth.

Remember that subsequent action regulation adjustments will affect those already performed. To prepare the action for fine regulation, do the following quickly:

Check or set repetition lever height so it is slightly higher than the jack. During your final regulation, trip the jack tender with your finger and release it slowly. If regulated properly, you will be able to feel the jack brushing the knuckle as it is released. The jack must return completely under the knuckle.

Set strike distance to 1 3/4. Be sure that hammer shanks are above the rest rail.

Check or set jack position so that the back edge of the jack is aligned with the back edge of the knuckle core.

Set let-off 1/8 from string in the bass, tapering to 1/16 in the high treble. Make sure that you have some drop after escapement.

Set drop to 1/16 below let-off.

With the above preliminary steps completed, level keys as necessary to their final specification. Note that with key height at the same specification as it was before action frame modification, key dip should be correct (assuming that the dip was correct prior to the installation procedure). Also, damper lift timing is reestablished.
Check or set repetition spring. The spring should carry the hammer upward with a steady motion, without kicking.

With the preliminary action regulation done, you are ready to establish the strike distance and key dip measurements that will result in proper after-touch. Since the key height/key dip relationship has been reestablished, consider varying only the strike distance to get the proper after-touch. If you are working on an older instrument, consider varying both strike distance and dip to arrive at an acceptable compromise. Select sample keys with which to work, like the first and last two keys in each section.

Depress your first sample key very slowly, stopping its movement just after let off. Look to see if there is additional key travel left. If there is no additional key travel after the let off point, there is no after-touch. Key dip will have to be increased, or strike distance will have to be decreased. If there is too much additional key travel after the let off point, the hammer may block against the strings when the key is played fully into its dip. Key dip will have to be decreased, or strike distance will have to be increased. Be sure that the sharps have the same after touch as the naturals. As a second check, see that with the key fully depressed, there is still some travel left at the jack tender.

When you have the key dip/strike distance established on your samples, set your key dip to your established specification uniformly throughout the action. You are now ready for the final regulation.
Using your new strike distance measurements, carefully repeat the above outlined steps for the final time.

Installation Procedure

Upright Piano Installation - Recommendations...

This section outlines the differences between the installation of the QRS kit in an upright piano versus a grand. The differences are relatively small, and an installer familiar with the installation procedure for a grand piano should have no difficulty installing the system in an upright. The differences are as follows:

On a grand piano the slot cut into the keybed is determined by the location of the keytails. The position of the action determines where to cut the slot and you mount the rail to the bottom of the keybed accordingly. On an upright piano, with limited space for the components, the slot location is determined the position of the key solenoid rail assembly. Begin by determining how close can you mount the rail to the plate and still have the plungers strike the bottom of the keys. And remember, you want the plungers as close to the back-end of the keys as possible.

On a grand piano we usually cut one long slot in the keybed for the key solenoid rail. We want to cut three slots in the upright to keep the wood at the break-points to support the action bracket studs. We suggest adding a piece of angle-iron to support the keybed. This is mounted at the back side of the balance rail.

Since the mechanism is hidden from view, a key solenoid rail cover is not necessary.

Sostenuto and Sustain Pedal Trapwork aren't used on the upright. We do recommend installing the pedal solenoid for better playback. The sustain pedal mechanism on an upright is very different from that of a grand piano and requires the installer to fabricate a mounting system specific to the individual piano.
As of August, 2013 QRS includes the Vertical Pedal Solenoid Lifter assembly in the upright kit.

In most cases, the back rail and back rail cloth must be relocated toward the back edge of the piano keys.
IMPORTANT: Care must be taken to first measure the key dip at the back end of the keys before any work begins. Secondly, after the back rail has been relocated, you must ensure that the key dip is exactly the same as it was before starting. If it is not, you must either trim the back rail or shim it up to its original measurement.

Special upright driver board mounting brackets are required for mounting the driver boards to the solenoid rail. These brackets are longer which allow the driver boards to hang below the solenoid rail to save space. Since the upright keybed is thinner than a grand, longer key solenoid rail mounting brackets are supplied with the upright kit.

SPECIAL NOTE: The driver boards are usually oriented differently on an upright which will change the order that the keys play. You can reverse the key order by selecting "Invert Keybed" in the "Playback Parameters" section of PMII.

All of the electronic components are mounted inside the piano in a place convenient for the installer.
Smaller speakers are supplied with the upright kit.

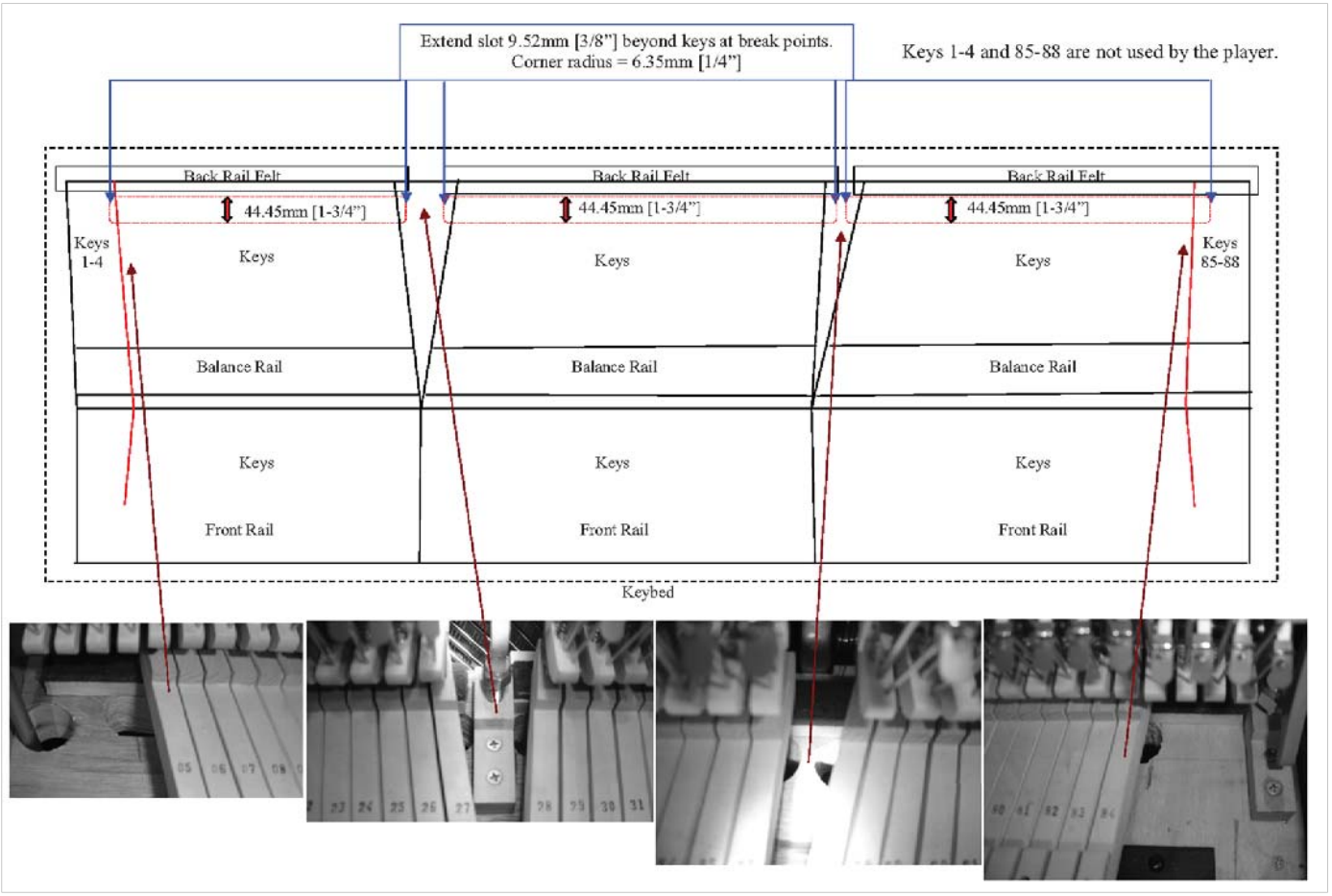
You may need to cut a 1" hole directly through the soundboard of the piano towards the bottom of the piano at the end where the power supply is usually mounted. This will allow the main power plug to easily be plugged into a wall outlet. This hole will not affect the sound of the piano in any way.

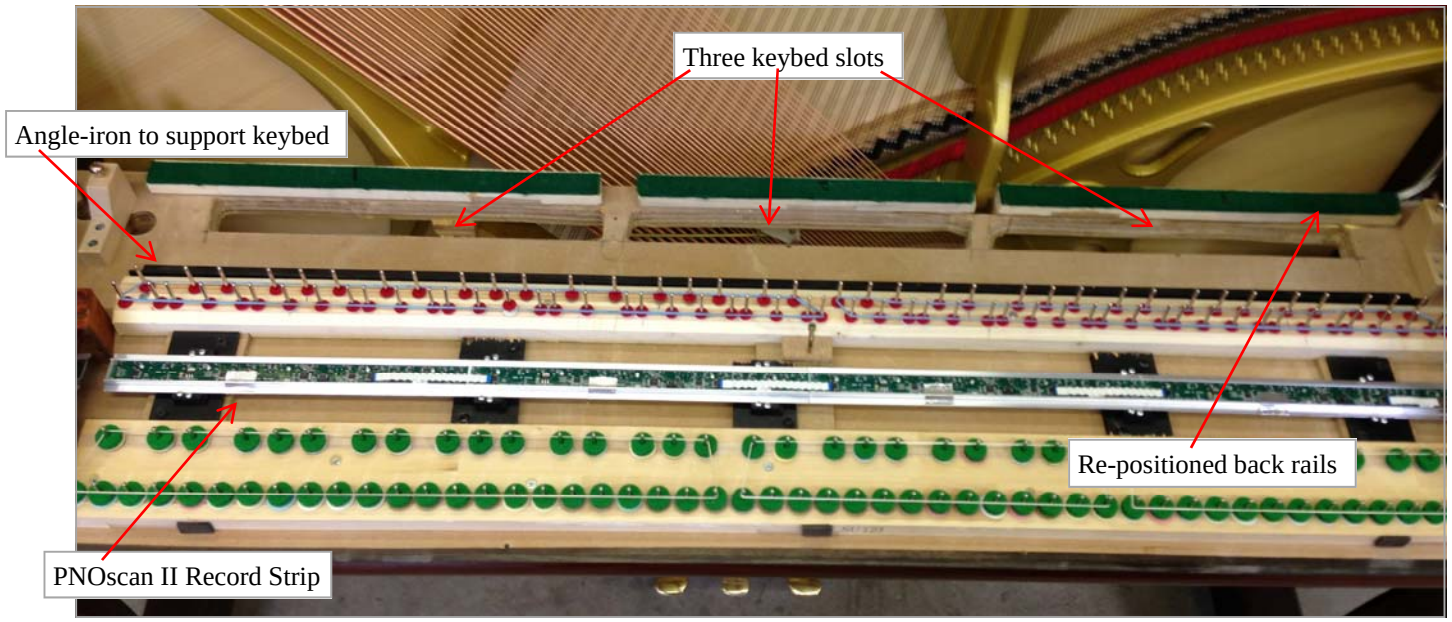
Alignment of the solenoid rail is made by laying a wooden stick at the top back edge of the keys and carefully transferring the centerline of each key onto the wooden stick. This stick will become your guide to position the key solenoids on the rail. Remember that a standard installation is 80 notes. Start with note #5 and end with note #84 and slide each pair of solenoids in direct alignment with your marks on the alignment stick and tighten the 11/32" nuts.

We've included some pictures on the next few pages to help you with the upright piano installation.

Installation Procedure

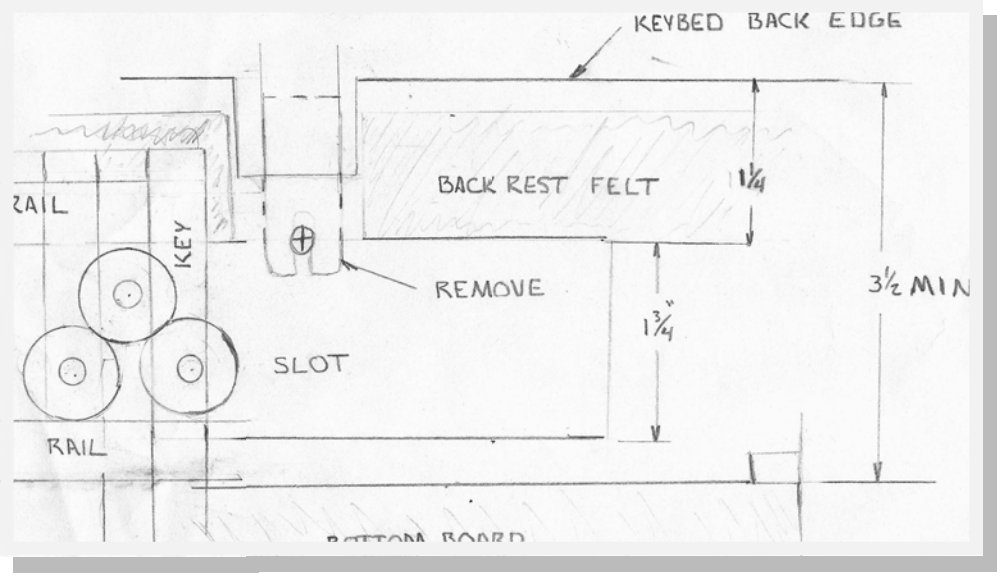
...Upright Piano Installation - Recommendations...

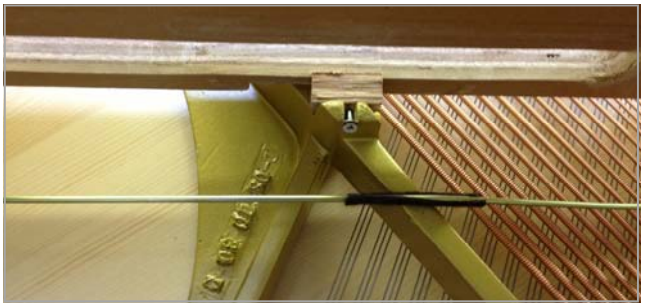




Installation Procedure

...Upright Piano Installation - Recommendations...



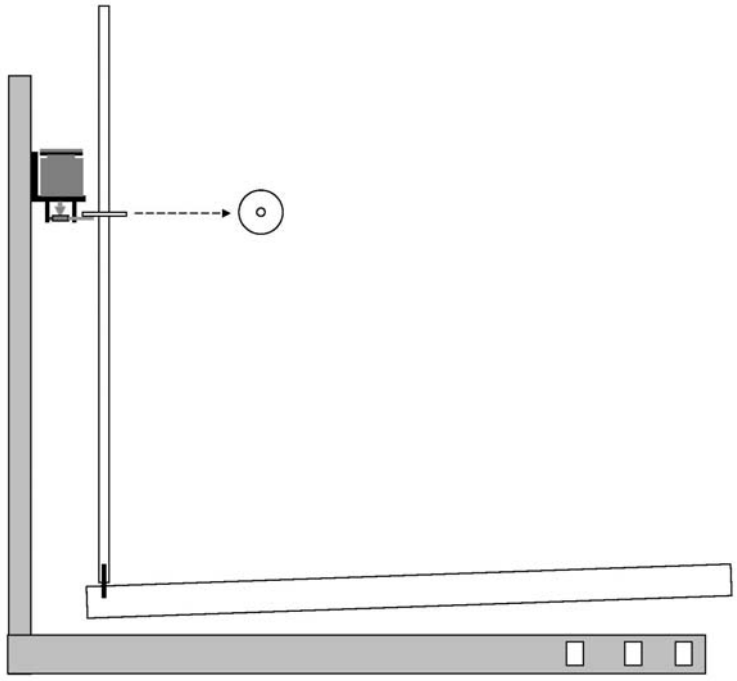


Installation Procedure

...Upright Piano Installation - Recommendations

Vertical Pedal Solenoid Lifter # 51045

Includes the Pedal Solenoid



This twin speaker set is a special order item.

Twin Speakers for smaller piano upright pianos # 76047

Mount two brackets. One on each side of each speaker . Use two screws per bracket.

Attach brackets to piano.

Installation Procedure

Preparing the Key Solenoid Rail

In this chapter, we determine the throw of the key solenoid plunger in relation to the piano action's key-tail travel. We also walk through the process of key solenoid alignment with respect to the piano actions keytails. When this chapter's work has been done, the solenoid rail will have the proper rail height and plunger throw. The mounting brackets will be in place and ready for mounting to the piano.

Tools needed include the 2 optional rail support brackets a 11/32" nut driver,
two rail bracket mounting screws, screwdriver, hacksaw, metal file, ruler and a pencil. The piano action is on your workbench and the keys are facing away from you.

The Pianomation Key Solenoid Rail is shipped assembled.
Its component parts are as follows:

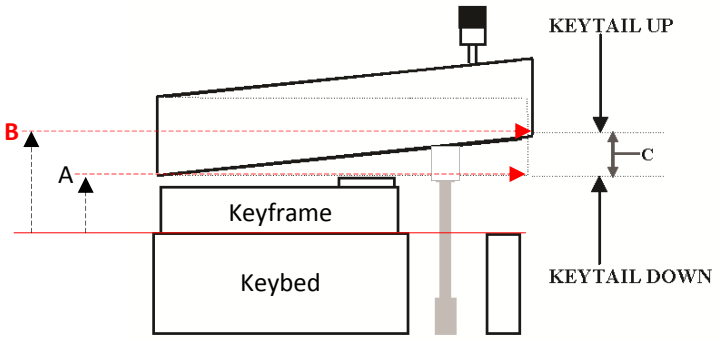
Key Solenoid Plunger Throw...

Step 1. To take advantage of PNOmation's best reproducing capabilities, it is essential that the plunger throw is slightly greater than the keytail lift.

Note the following measurements:
B. Measure the bottom of the keytail to the keybed at the KEYTAIL UP position.
A. Measure the bottom of the keytail to the keybed at the KEYTAIL DOWN position.

B=_____
A=_____

B-A(C)=_____

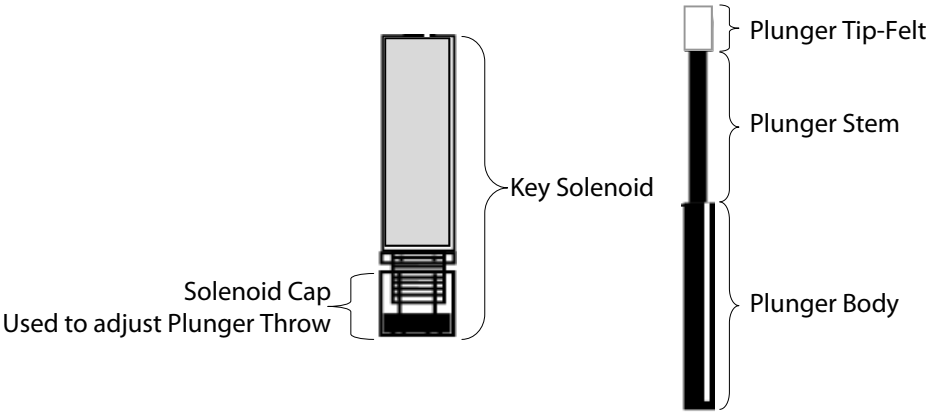


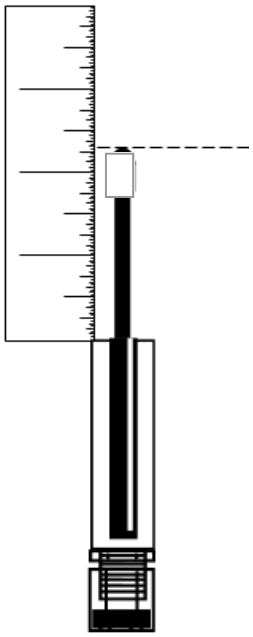
Step 2. Take the key lift measurement "C" above and add 1/16" to compensate for the felt plunger tip. This is the measurement used to find the rest position of the plunger.

Plunger Throw = C + 1/16" _____

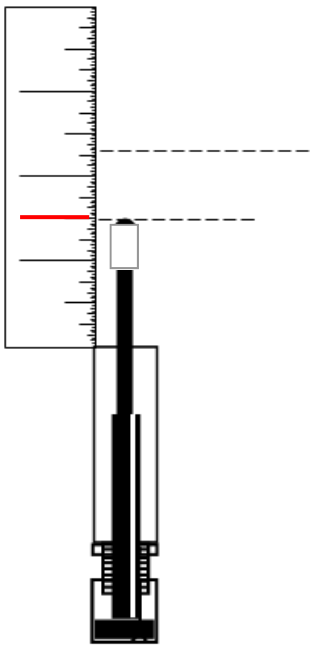
Installation Procedure

...Key Solenoid Plunger Throw





Step 3. Hold the plunger in its "ON-HOLD" position.
This On-Hold position is where the TOP of the Plunger Body is flush with the top of the solenoid.
Position a **gauge**, a piece of wood or cardboard, and mark the location of top of the Plunger Tip.
Release the plunger.



Step 4. From the position marked in step 3, use a ruler to measure the **Plunger Throw** distance (step 2) and mark your gauge.

Step 5. Turn the Key Solenoid Cap to move the Plunger Tip to your mark.

NOTE: If the cap won't raise the plunger high enough because it is tight against the solenoid housing, no more threads, remove the plungers and insert Lost-Motion felt washers.

Step - Final. Adjust all lost motion caps to the same position.

Installation Procedure

Key Solenoid Rail Assembly - Solenoid to Key Alignment

With the piano action on your workbench and the fronts of the keys facing away from you. Place the solenoid rail on the workbench in front of the keytails and put the plungers inside the solenoids. Turn the solenoid rail assembly on its side, so that the plungers are now parallel to the workbench surface and the felt plunger tips are touching the back ends of the piano keys. The first plunger should start all the way to the left side of the rail. Secure the rail and action with the two clamps so they will not move during the alignment process. Mark which side is bass and treble. Make sure all the solenoid plates are free moving. If they are not, use an 11/32" nut driver to loosen them.

The spacing between sections has been held in check by the introduction of solenoid assembly pairs adjacent to the breaks. Because not all sections on a piano will have an even number of notes played in them, those which have an odd number will require a modified solenoid assembly to provide the additional note required, and this modified note will be placed adjacent to a section break or at either end.

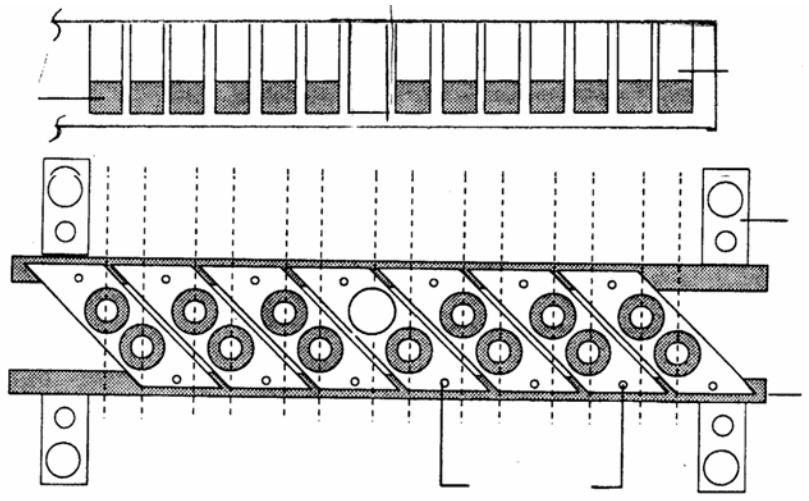
Count the number of keys to be played in each section. If there is an even number, align the solenoids with plungers already on the rail with the centers of their respective key tails. If the number of keys to be played is odd, simply remove one of the solenoids from the double mounting bracket and continue to the alignment of the next section.

If necessary, cut away the unused portion of the rail ends with a hack saw and file off all burrs with a metal file. Be careful not to cut away the rail bracket mounting holes, or cut any solenoid wires.

Mount all 8 rail support brackets to the rail with the 10-32 X 7/16" screws and #10 external star washers.

Note: The distance from the bottom of the keybed to the bottom of the keytail felt should be equal to the distance from the top of the solenoid plunger to the top of the rail mounting brackets.

At this stage, the key solenoids have been matched up with their corresponding keytails. The rail has been cut to length, and the rail brackets attached in place. Put the rail aside for future installation in the piano.



Installation Procedure

Modifying the Keyframe - Grand...

If you are installing a QRS PNOscan II record system you should incorporate it's installation while modifying the piano action. The PNOscan II has it's own installation manual.

The Keyframe will probably require modification to accommodate the Key Solenoid Rail Assembly. The key tails must protrude over the back of the action frame, so the rear of the key frame must be cut away.

Tools needed for this chapter: pencil, paper, wood chisel, straightedge, jig saw, palm sander & sand paper, utility knife, wood glue and an assortment of screwdrivers.

At this point in the installation, the piano is on its legs, the fall board, keyslip, and cheek blocks have been removed, and the lyre is still in place. The piano has been measured to verify that the Note Rail Assembly will fit.

Measure the distance the action shifts when the left (una corda) pedal is pressed. (If a hammer lift rail is installed, measure the distance the hammers lift for a given movement of the soft pedal lyre lift rod.) Measure the distance the soft shift (una corda) pedal lift rod travels when the pedal is depressed. Write these measurements down for later trapwork installation.

Remove the entire grand or upright piano action from the piano and place it on a clean, level workbench. Do not depress the keys while sliding the action in or out of the piano, or broken hammers will result.

Examine the relationships of the key tails to the rear edge of the keyframe. Each key tail must have at least 1-1/4" exposed beyond the rear edge of the key frame. If this is not the case, then the key frame must be modified. If modifications are required, follow these steps:

IMPORTANT: **Before removing the hammer action from the key frame action you must first measure the distance from the bottom of the key frame action to the bottom of the piano key. Next, depress the key and measure once again, from the bottom of the key frame action to the bottom of the key. Write these measurements down for later use.**

With a screwdriver remove the wooden key stop rail from the key frame.
With a screwdriver remove the hammer action from the keyframe, being certain to note any screw length differences in the 8 or 10 wood screws used to secure the action to the keyframe. It is always advisable to put the same screw into the same hole.
Verify that the keys are properly numbered before removing them. Remove all keys except key numbers 5, 84, and the break keys. With a pencil, mark 1-1/4" in from the ends of the key tails onto the keyframe. Allow an additional 1/4" at either end of each section. With a straightedge to guide you, connect the marks in each section. Removal of the back rail felt may be required before this step. (Figure 1)

The back rail felt rests beneath the key tails, and can be removed by using a sharp utility knife or in some cases a wood chisel. Place the removed back rail felt to the side for future use when relocating and re-gluing in its new position.

Installation Procedure

...Modifying the Keyframe - Grand...

The key frame must now be cut. Remove all keys. With a jig saw, follow the pencil line and cut away the frame in each section between the breaks.
With the palm sander, clean up all the rough edges.

The action is now ready to be used to locate the positions of the slots through the piano's keybed.

Place the keyframe into the grand piano case and secure it with the right and left cheek blocks. With a short, sharp pencil, reach into the keyboard compartment and mark the notched rear most limits of the keyframe, including the right and left extremes of each notch. These lines will be used to identify the exact locations of the keybed slots on the underside of the keybed, so be certain to make well-defined pencil lines.

Remove the keyframe and reglue the keytail felt flush with the back of the keyframe. Measuring the key dip before and after repositioning the felt is recommended. If it is the same, less regulation will be required. If it has changed, simply shim the back edge with a thin piece of cardboard to maintain the original key dip.

Newer kits include key solenoid plungers with felt tips. Therefore we no longer provide the felt strip below.

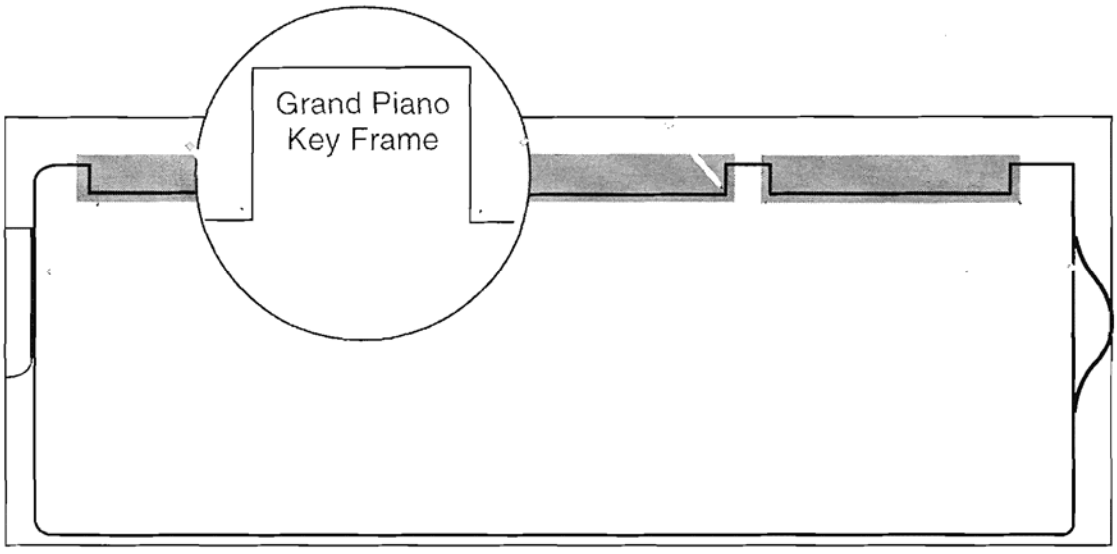
Note: This is a good time to install the optional 88 note record strip (70014). See the PNOScan record strip installation manual.

Place all of the keys back on the key frame.

Re-install the hammer action on the key frame, using the same 8-10 screws you removed earlier.

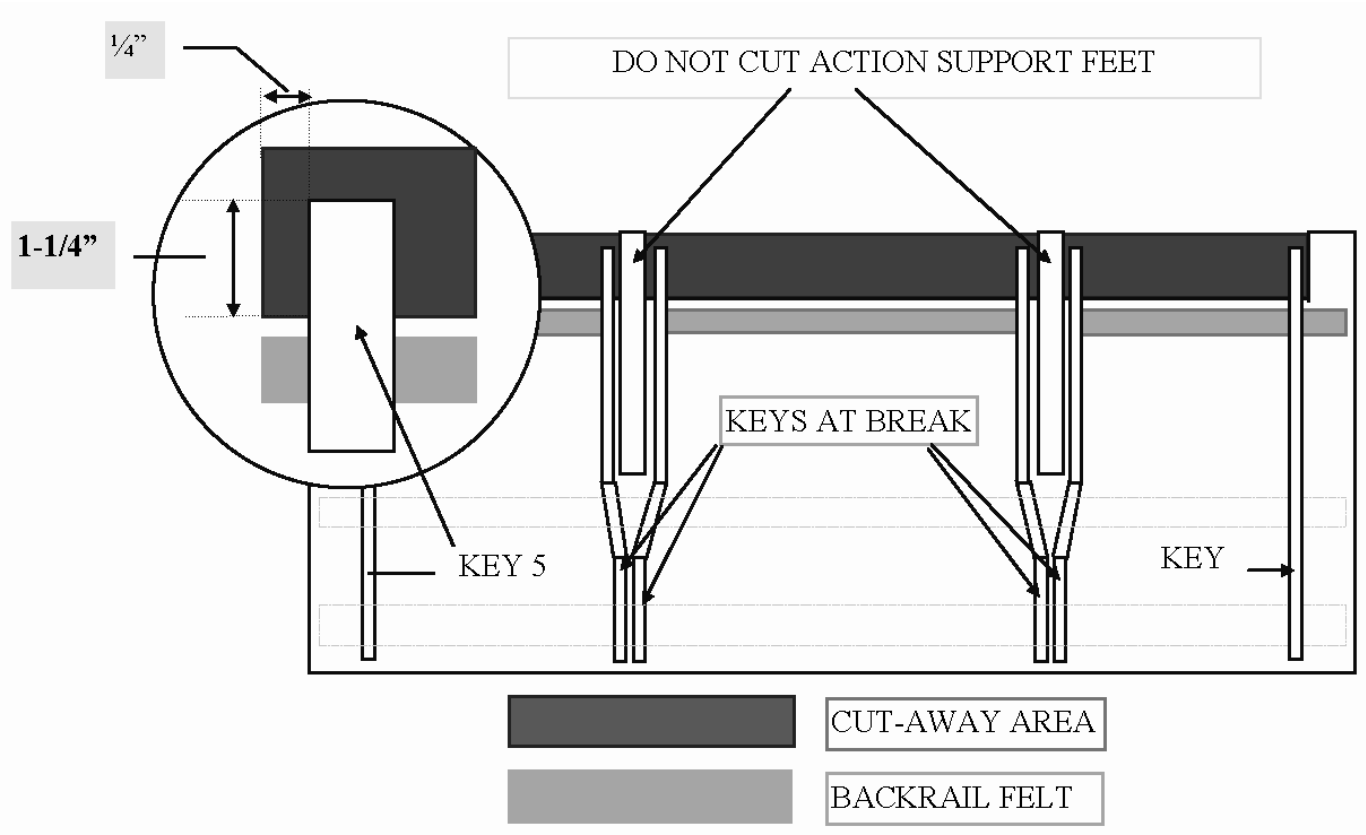
Re-install the Key Stop Rail.

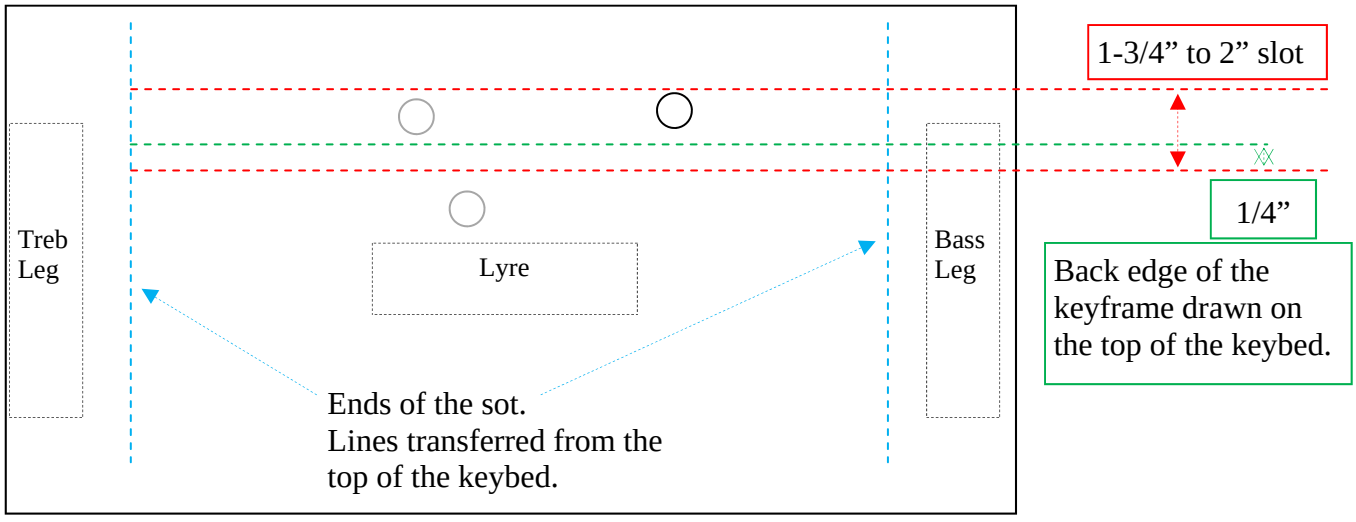
At this point, the grand action modifications are complete.
For best player performance it is important that the action be regulated properly.



Installation Procedure

...Modifying the Keyframe - Grand




1-3/4” to 2” slot
1/4”
Back edge of the keyframe drawn on the top of the keybed.
Treb Leg
Lyre
Bass Leg
Ends of the sot.
Lines transferred from the top of the keybed.

Installation Procedure

Cutting the Keybed Slot...

Tools needed for this chapter include a circular saw (sabre saw with a sufficiently long blade/ router may be used), a power drill with a sharp 1-3/4" Forstner bit (or wood boring bit), various screwdrivers, a frame square, a pencil, a tape measure, and paint that matches the underside of the piano.

At this point the piano is on its legs, the action is outside of the piano case and has been modified to allow the key tails to protrude over the rear of the key frame by 1-1/4". Felts are attached to the undersides of each key tail, and the original trapwork is still in place.

Next, have an assistant press the sustain pedal. While he depresses it, measure the distance the pedal lyre lift rod moves and write it down. Likewise, measure the distance the damper lift rail rises when the pedal is pressed. This measurement can be taken from inside the case. Next, mark the exact location of the upward extension of the pedal lyre's vertical rods onto the keybed bottom. Set these measurements aside for later trapwork installation.

Repeat the above step with the Sostenuto pedal (if it exists).

There may be two or more action stop blocks inside the case. These blocks stop the insertion of the grand piano keyboard at the proper location and prevent it from lifting up off the keybed. In the event that these interfere with the slot to be cut, remove by force applied by a sharp chisel and hammer.

Remove the lyre from the piano.

Turn the piano on its flat or bass side and secure it. Make a visible pencil mark outlining the bass and the treble legs. Next, remove each leg marking them accordingly (bass, treble, tail) and place in a safe area to prevent damage.

Use a pencil and mark the lyre rod strike points (where the lyre rods hit the original trap work) on the bottom of the keybed. Remove all trapwork, and other parts that may interfere with the keybed modifications from the underside of the piano.

Using a tape measure, record the distance from the front of the piano case to the marks you previously made inside the case. Do this on both the bass and treble end. Call this the depth measurement.
Transfer the slot marks made on the inside of the piano case to the underside of the keybed.

For Upright installations, See Page 9.

Installation Procedure

...Cutting the Keybed Slot

Taking into account any variations in the contour of the front of the piano and using the frame square aligned with the mark just made on the front underside of the keybed, measure and mark the depth measurement on the underside of the keybed. Next, measure 1/4" toward the front of the piano scribing a straight line between the bass and treble notes. Then measure 1-3/4" toward the rear of the piano from the newly scribed line. Whenever possible we recommend keeping in the breaks.

Each slot should be at least 1-3/4" wide (2” Maximum). The longitudinal center of each slot must correspond to the center line of the felt padded key tails, which is 1/2" in from the end of each key.

Verify the marks just made. Drill a small exploratory hole within each slot and compare the position of the slot with the marks made inside the case. Correct each slot position as required.

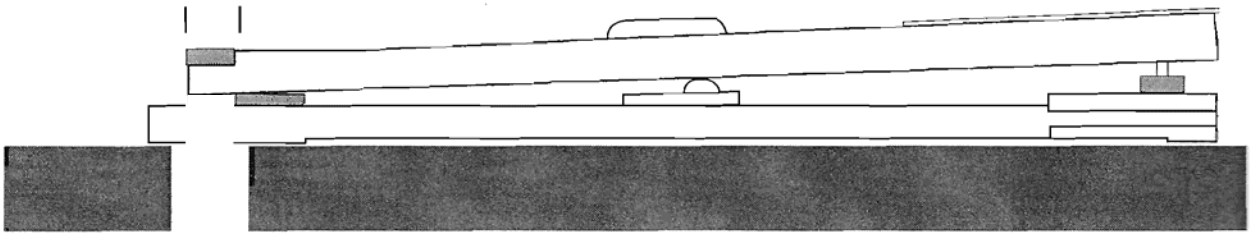
Using a 1-3/4" Forstner bit, drill holes centered at the ends of each slot.

Cut the lengths of each slot with a sabre saw, circular saw or router (being extremely careful with all power tools), connecting the end holes just made. Avoid cutting away the breaks between the slots if possible.

Rasp or sand the slots smooth and square with the surface of the keybed. Bevel the top most slot edges with coarse sand paper. The slots should be sealed with paint matching the bottom of the piano, or a clear sealant to retard drying of the wood.

At this point the slots have been positioned and cut. Now is the time to remount the Soft Shift Lever.

Side View of Modified Keyframe and Keybed

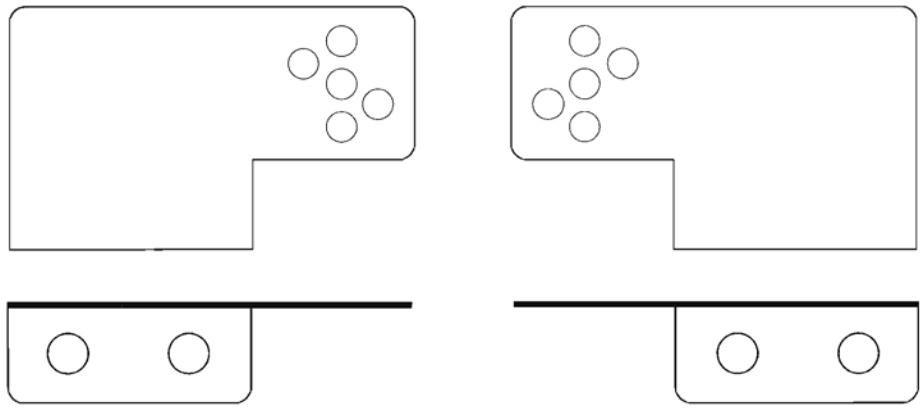


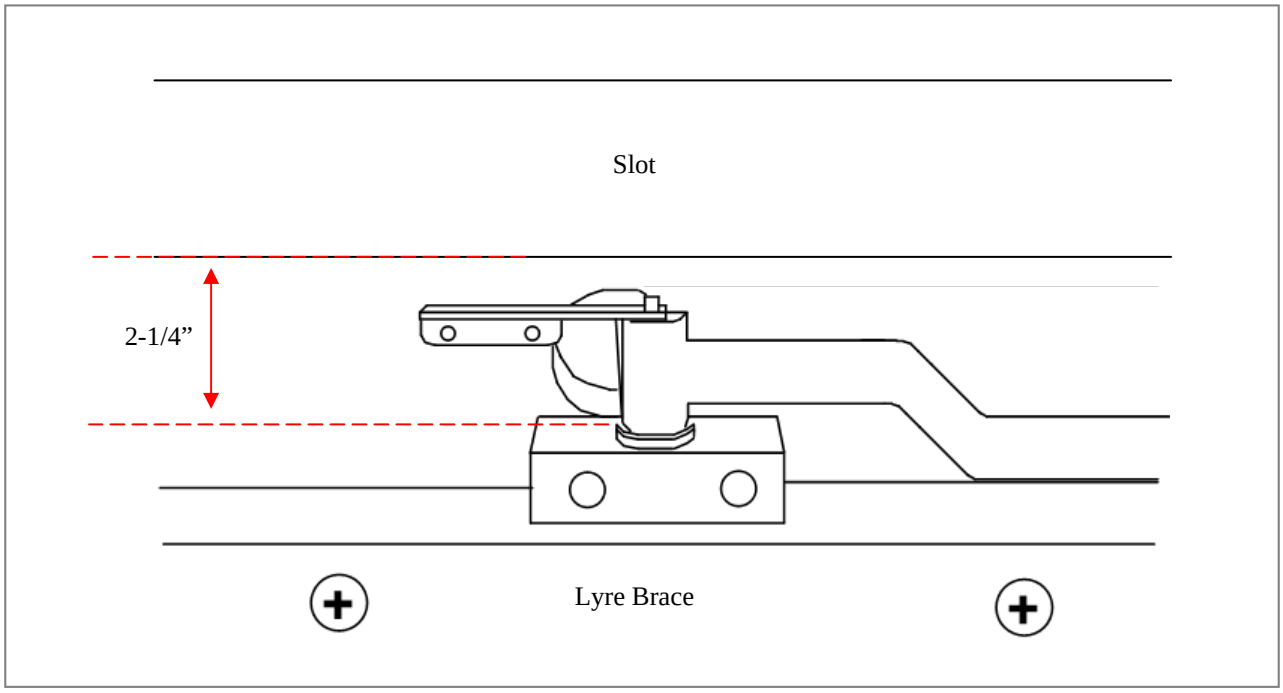
Installation Procedure

Installing the Soft-Shift Lever

The Soft Shift (una corda) pedal mechanism usually includes a long, cast-iron bell crank lever whose short arm protrudes though the keybed to engage a groove cut in the bottom of the keyframe somewhere beneath the treble section. The shift pedal in this configuration does not have to pass through the solenoid rail and, therefore, may often be left untouched. However, on some pianos you may have to move the soft shift toward the front of the piano to accommodate for the width of the rail. For the pianos that need modification, brackets have been included in the kit for easy readjustment. **It is a good idea to leave one of the original wooden blocks attaching the soft shift lever to the key bed, and only use one of the brackets supplied. This will make adjusting the Soft Shift lever much easier**. The brackets can be attached to the keybed with four #10 x 1" mounting screws. The pedal must shift the action the same distance as before with the same pedal movement. Refer to the measurements taken when the trapwork was removed to verify that this behavior has been retained (See "Modify the Piano Action" section).

Measuring from the front edge of the slot there should be 2-1/4 inches to the front edge of the soft-shift hole.





Installation Procedure

Installing the Sustain Pedal Trapwork...

General Recommendations

When you are at the point where you are ready to start removing the original trapwork system from the piano we recommend that you trace around the trap components before you actually remove them. This is just a good reference should you have questions about leverage, stroke or placement after you have removed everything. You should also trace around anything else you will be removing such as the piano legs.

It is normally a good idea to install the new trap components (except for the Sostenuto) after you install the solenoid rail because there is only one correct place the rail can be installed, where as the trap components are somewhat flexible in their placement. The first is deciding if you need to mill any areas of the keybed besides the rail slot itself. The most likely places that would require special milling would be to mill a recess for the Sostenuto actuator assembly so it can be mounted above the solenoid rail. Another case would be to mill a pocket in the keybed to accommodate the up most position of the soft shift lever such as on a Steinway. You might be milling a slot perpendicular to the solenoid slot to fit a bridge support if you can't leave one when you cut the main slot. Depending on the situation you may need to drill a new hole for the sustain dowel. It is important to realize these possibilities before you cut the slot. You don't want to cut the slot, clean up the mess and install the solenoid rail just to find out you need to cut more material to accommodate a piece of the trap hardware!

Once you have the slot laid out on the bottom of the keybed (we recommend using a soap stone or med tip grease pencil), it will be much easier to conceptualize how you will configure the trap system. With the lines drawn exactly where the slot will be cut, you will be able to tell what obstacles will need to be moves, modified or worked around. For instance if you are installing a 88 note rail, you will immediately see what needs to be done to the piano legs. (you should have traced around the legs before you remove them.) You can measure the total width of the solenoid rail and soft shift lever assembly, reference this measurement off the front of the slot line you drew and decide if you need to move the lyre assembly forwards.

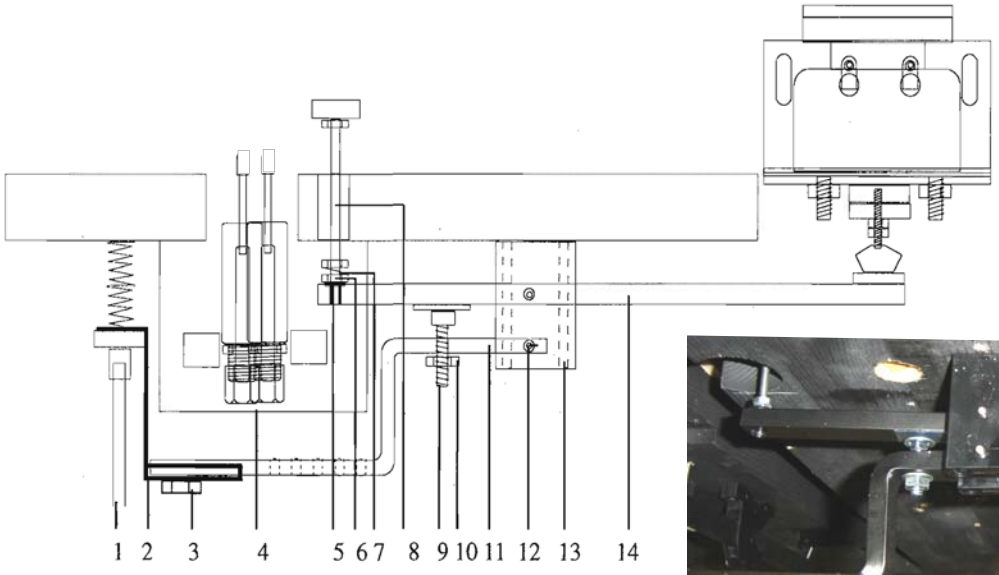
The chapters that follow this overview will provide explanations and graphic details that will help you realize the ideas behind the hardware design. For the most part, you will find that the hardware we supply will adapt easily to a typical installation bit keep in mind that the hardware we have designed can be easily modified to adapt to unique applications. If bending a lever to fit your particular installation fits the bill, then bend as needed. It's your ingenuity that finalizes the hardware's conformity.

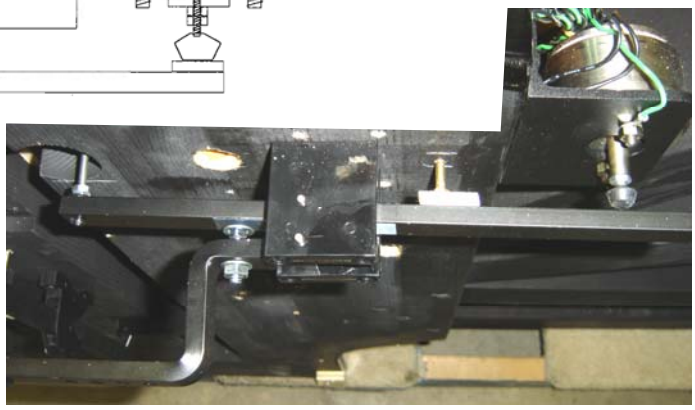
Installation Procedure

...Installing the Sustain Pedal Trapwork

1	Draw a Straight line between the sustain hole in the keybed, lyre sustain push rod and the Pedal Solenoid.
2	Place the trapwork on the keybed so that it follows that line
3	Fasten the trapwork to the keybed with the 4, 3 1/2” screws provided.
4	Screw the locking nylon nuts onto the #8 Damper Tray Push Rod so that it supports the damper tray. Screw the 2 #8 nuts with a washer on the other end.
5	Insert the #8 Damper Tray Push rod onto the Damper Tray.
6	Align the #8 Damper Tray Push Rod with the predrilled hole in the Trapwork Straight Bar. Put the Nylon Collar in that hole.
7	Place felt or leather on the Adjustable Lyre Rod Lever where the sustain push rod makes contact with the Adjustable Lyre Rod Lever.
8	Adjust the Lyre Rod Lever until it reaches over the lyres sustain push rod.
9	Adjust the 2 #8 Nuts so that the dampers fall to a full rest on the strings
10	Tighten the nuts after all the lost motion is out.
11	Notch the Solenoid Rail cover where the Trapwork Straight Bar enters
12	Adjust the Pedal so that there is 1/4” lift on the damper tray

1 Lyre Rod
2 Adjustable Lyre Rod Lever
3 Adjustable Lever Bolt
4 Solenoid Rail Cover
5 Nylon Collar
6 Nut
7 Lock Washer
8 Damper Tray Push Rod
9 Carriage Bolt
10 Carriage Bolt Nut
11 Trapwork Bar “S” Shaped
12 Nylon Washer
13 Nylon Mounting Block
14 Trapwork Straight Bar





Installation Procedure

Installing the Sustain Pedal Solenoid - Grand...

You can now turn your attention to the installation of the sustain pedal solenoid assembly.
This procedure is not required when sustain pedal is not installed.

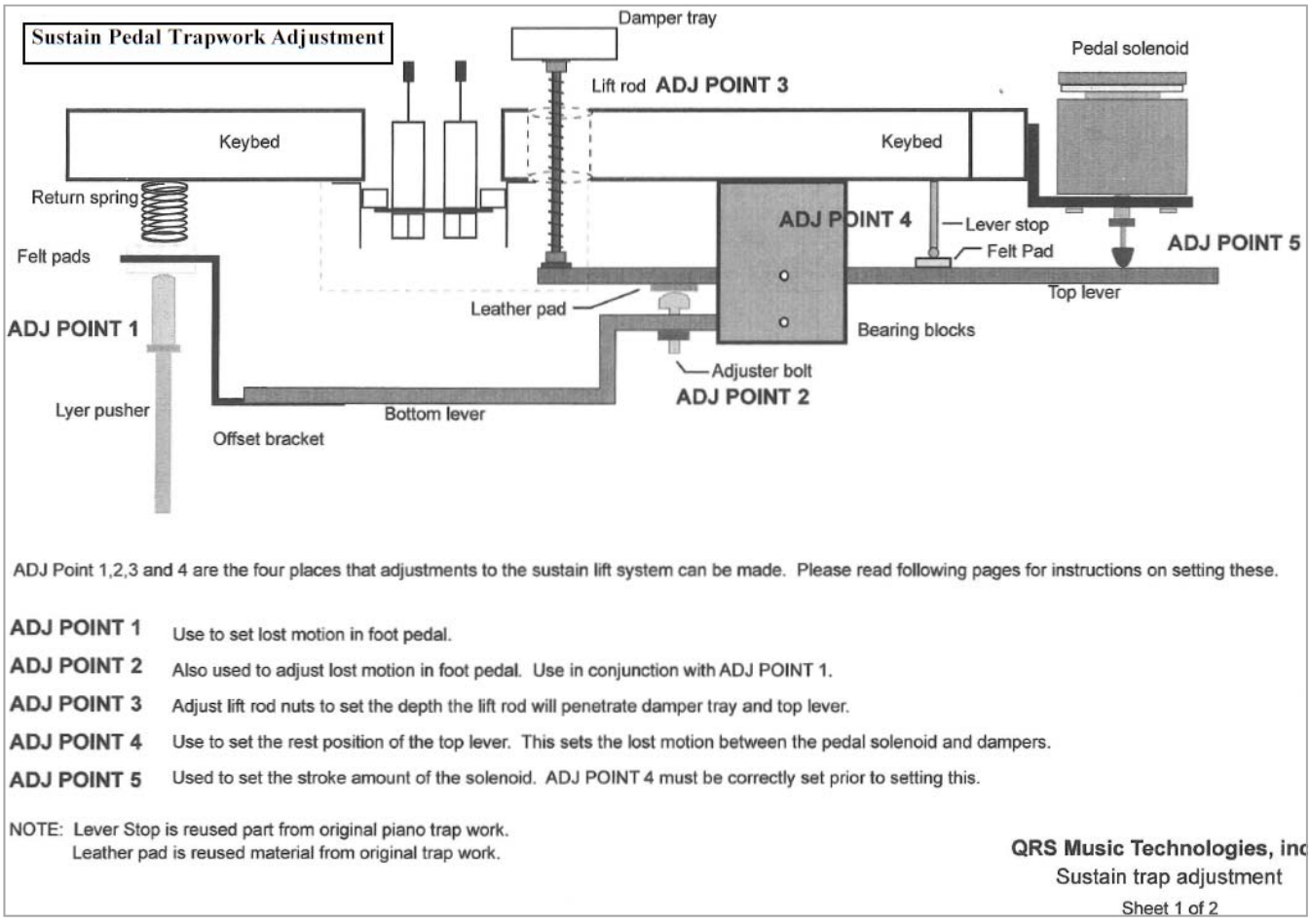
Because there is a certain amount of variation in the architecture of grand pianos, you will probably have to custom-tailor the following directions to suit the mechanical dimensions of the particular instrument you are working on.

The key elements to focus on here include the sustain pedal lyre rod's upward projection onto the keybed immediately above it, the location of the large hole through which the original sustain pedal pitman dowel projected to reach its corresponding hole in the wooden or aluminum damper tray (which lifts all of the piano's dampers simultaneously), and the rearmost OUTSIDE vertical wall of the keyboard compartment, called "the belly rail." The proper installation of the sustain pedal solenoid assembly takes into account the dimensional relationships of these three elements.

In addition to providing for both the manual and automatic operation of the piano's dampers, you want to give the sustain pedal solenoid as much mechanical advantage as possible in order to minimize the power required to activate it. Despite the excellent design of the sustain pedal solenoid assembly, its long term operation depends upon your skill in locating the various leverage-points which enable it to function both manually and automatically.

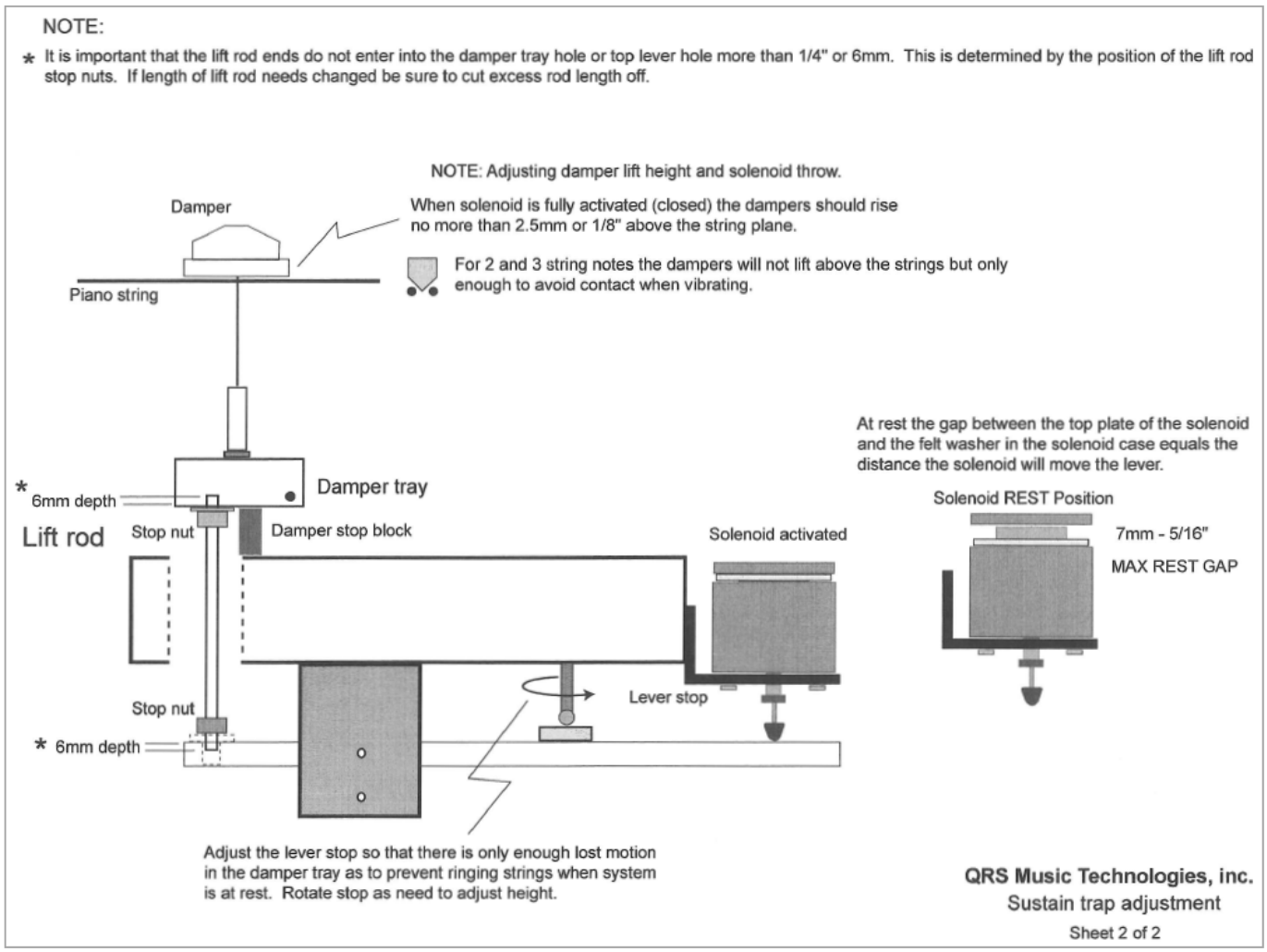
Optimally, the sustain pedal solenoid assembly will be mounted on the belly-rail immediately behind the sustain pitman dowel which formerly connected the old trapwork lever's far end to the damper tray in the keyboard compartment. This arrangement provides the shortest distance between the sustain pedal solenoid assembly's lever-arm and the load imposed by the damper tray through the pitman dowel. Where such a situation exists, you will use the four mounting holes to locate the four #10 x 1" panhead screws used to secure the pedal solenoid to the belly-rail. If the belly rail is too close to the pitman dowel, locate the solenoid on a frame member or on an extension attached to the frame member.

Now, measure the distance from the center of the pedal solenoid's pusher tip to the exact center of the damper tray's pitman rod location. Sixty percent (60%) of this distance FROM THE PEDAL SOLENOID'S CENTER (that is, the lion's share of this distance) is the location of the fulcrum of the trapwork assembly's straight bar. The remaining 40% of this distance becomes the minor portion from the fulcrum to the pitman dowel.


Sustain Pedal Trapwork Adjustment
Damper tray
Pedal solenoid
Lift rod
ADJ POINT 3
Keybed
Keybed
Return spring
ADJ POINT 4
Lever stop
Felt Pad
ADJ POINT 5
Felt pads
Top lever
Leather pad
ADJ POINT 1
Bearing blocks
Adjuster bolt
ADJ POINT 2
Lyer pusher
Bottom lever
Offset bracket
ADJ Point 1,2,3 and 4 are the four places that adjustments to the sustain lift system can be made. Please read following pages for instructions on setting these.
ADJ POINT 1 Use to set lost motion in foot pedal.
ADJ POINT 2 Also used to adjust lost motion in foot pedal. Use in conjunction with ADJ POINT 1.
ADJ POINT 3 Adjust lift rod nuts to set the depth the lift rod will penetrate damper tray and top lever.
ADJ POINT 4 Use to set the rest position of the top lever. This sets the lost motion between the pedal solenoid and dampers.
ADJ POINT 5 Used to set the stroke amount of the solenoid. ADJ POINT 4 must be correctly set prior to setting this.
NOTE: Lever Stop is reused part from original piano trap work.
Leather pad is reused material from original trap work.
QRS Music Technologies, inc
Sustain trap adjustment
Sheet 1 of 2

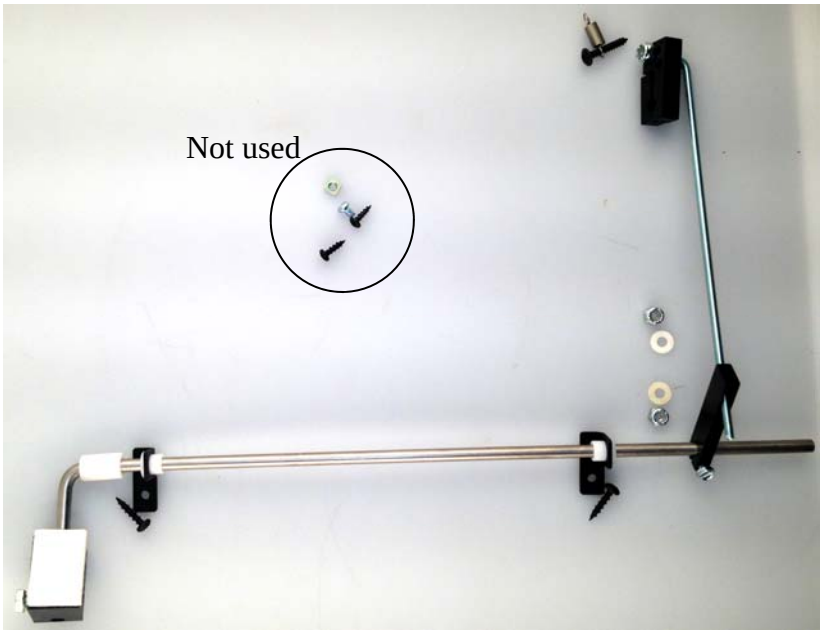
Installation Procedure

...Installing the Sustain Pedal Solenoid - Grand


NOTE:
* It is important that the lift rod ends do not enter into the damper tray hole or top lever hole more than 1/4" or 6mm. This is determined by the position of the lift rod stop nuts. If length of lift rod needs changed be sure to cut excess rod length off.
NOTE: Adjusting damper lift height and solenoid throw.
Damper
When solenoid is fully activated (closed) the dampers should rise no more than 2.5mm or 1/8" above the string plane.
For 2 and 3 string notes the dampers will not lift above the strings but only enough to avoid contact when vibrating.
Piano string
At rest the gap between the top plate of the solenoid and the felt washer in the solenoid case equals the distance the solenoid will move the lever.
Solenoid REST Position
7mm - 5/16"
MAX REST GAP
* 6mm depth
Damper tray
Lift rod
Stop nut
Damper stop block
Solenoid activated
Lever stop
Stop nut
* 6mm depth
Adjust the lever stop so that there is only enough lost motion in the damper tray as to prevent ringing strings when system is at rest. Rotate stop as need to adjust height.
QRS Music Technologies, inc.
Sustain trap adjustment
Sheet 2 of 2

Installation Procedure

Install the Universal Sostenuto Assembly...



Identify the piano's Sostenuto type.

Push - The Sostenuto is engaged when the actuator rises toward the strings.

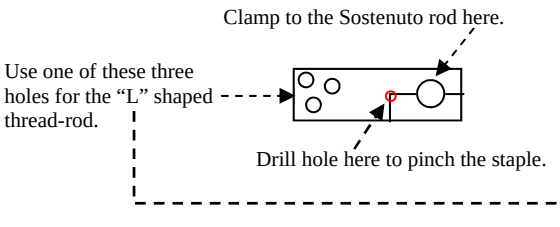
Pull - The Sostenuto is engaged when the actuator descends away from the strings.

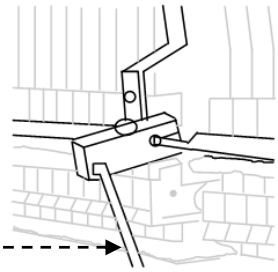
Steinway - Part of the assembly is built into the action.
You will need to **order** the Steinway Sostenuto Assembly from QRS.
Part # **70897**

These instructions explain a Pull Type Sostenuto installation.

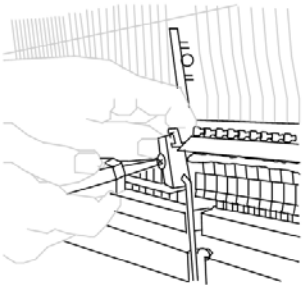
Remove the existing actuator attached to the Sostenuto blade.

Drill a hole in the new actuator for the staple.


Clamp to the Sostenuto rod here.
Use one of these three holes for the "L" shaped thread-rod.
Drill hole here to pinch the staple.



Connect the actuator to the staple on the Sostenuto bar. Clamp the actuator over the bar so the staple is pinched by the hole just drilled and the large hole clamps around the rod. Tighten the actuator screw.



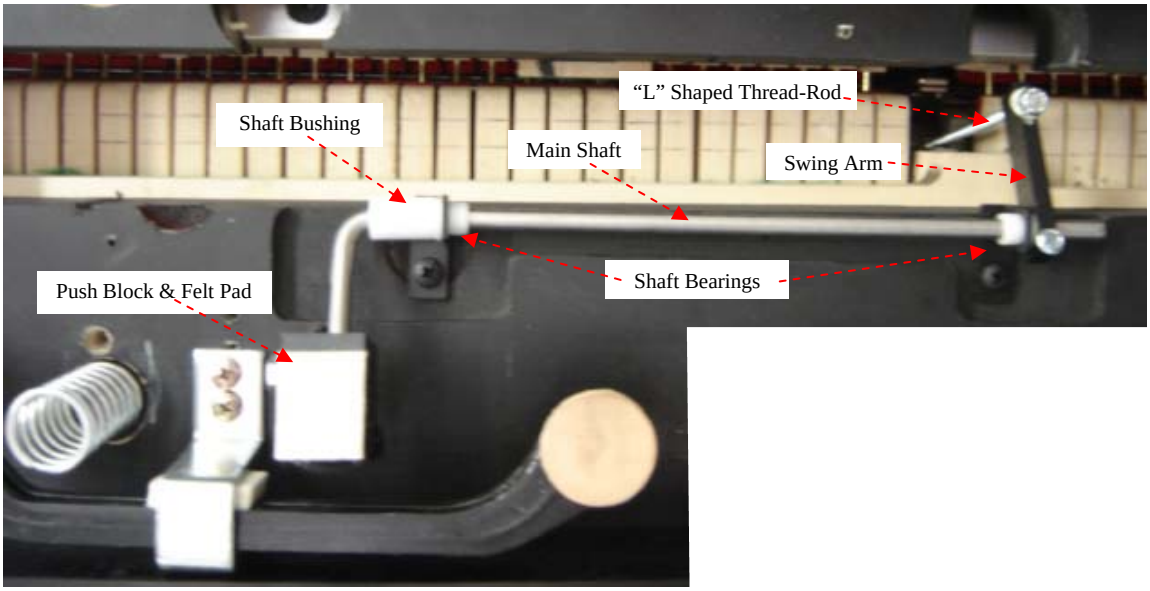
Push the "L" shaped thread rod through one of the three holes in the actuator and secure with the lock-nut.

Installation Procedure

...Installing the Universal Sostenuto Assembly...

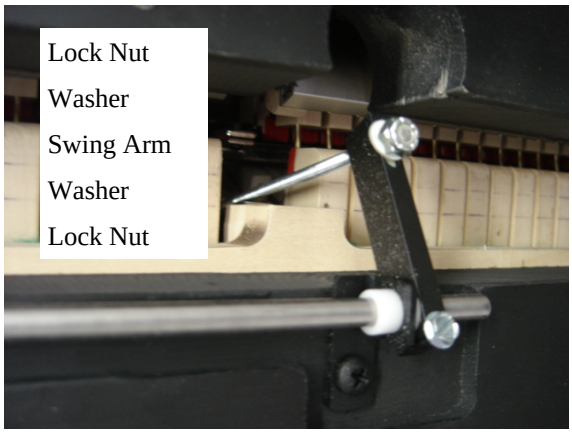
Install the push lever which consists of the Push Block, the Main Shaft, the Shaft Bearings and the Swing Arm.

Determine placement of the push lever by first installing the pedal lyre on the piano. Place the push lever so that the end of the lyre's Sostenuto rod is on the outer edge of the push block when the pedal is not depressed. Make sure that there is clearance as the push block travels through its arc as the pedal is depressed. The push block position is adjustable by loosening the set-screw. There are several indents in the shaft for positioning. Also note the position of the shaft bearing and bushing has been placed as close to the bend in the shaft as possible to prevent the bushing from working its way out during operation. Only this shaft bearing should be fastened in place at this time. It is OK for the shaft bearings to slightly overhang the slot.
The assembly may need inset into the keybed to accommodate the key solenoid rail and rail cover.



Insert the second Shaft Bearing and the Swing Arm to the Main Shaft. Screw the first lock-nut onto the thread-rod and then a washer. Push the thread-rod through the oval hole in the Swing Arm and then add the second washer and lock-nut. Do not tighten the lock nuts.

Center the thread rod/Swing Lever assembly in the slot being mindful of where the piano keys and solenoid rail will be located. The Sostenuto parts can touch neither when the installation is completed. Once the activator assembly is centered properly you can screw the second shaft bearing in place.



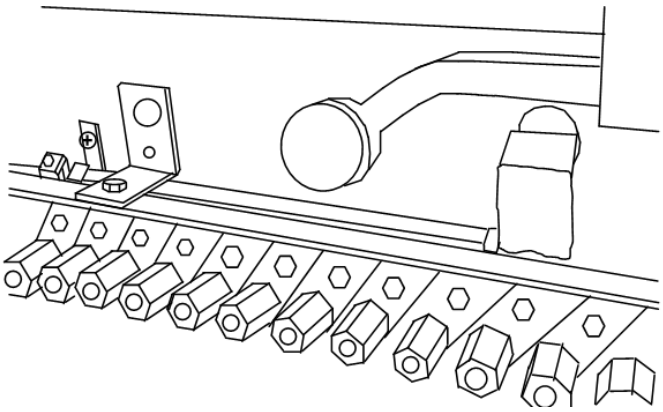
Installation Procedure

...Installing the Universal Sostenuto Assembly

Attach the small return spring to the thread-rod so it pulls up on the actuator. You'll have to find a convenient place above the actuator to attach the other end of the spring.

Adjust the Sostenuto by loosening the locking screw on the swing arm to allow the main shaft to spin freely without activating the Sostenuto. Swing the main shaft so that the brass insert on top of the push block is centered on the spring with the pedal in the rest position. Rotate the swing arm so that the piano's Sostenuto tab lifter bar is about 1/16" away from damper Sostenuto tabs. Tighten the swing arm locking screw. Push the Sostenuto pedal on the lyre and inspect the operation of the mechanism. When the pedal is depressed the tab lifter bar should be nearly parallel with the key bed.

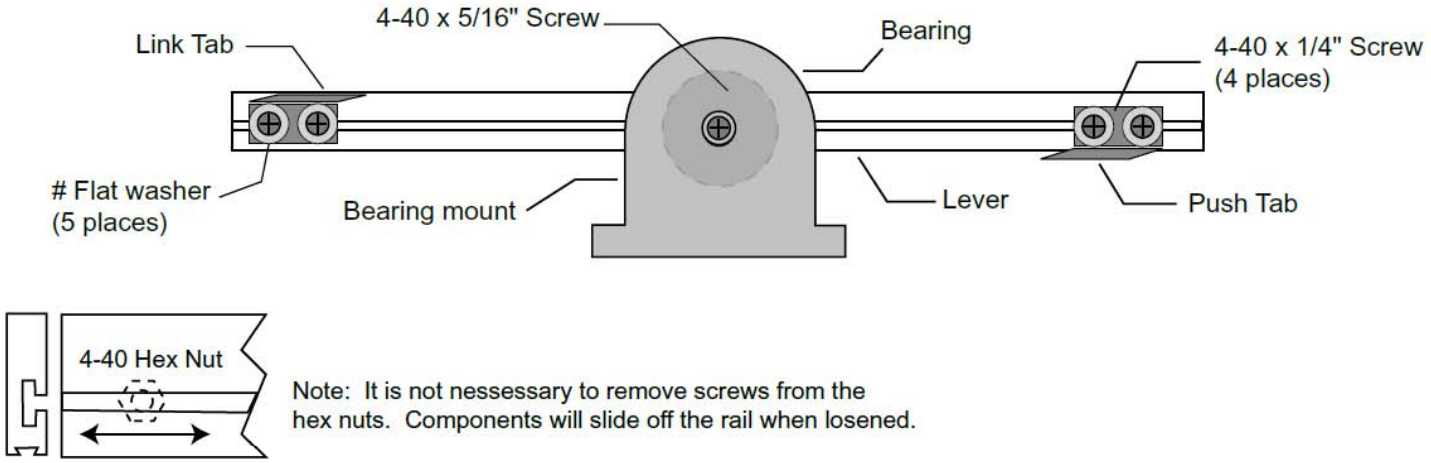
Install the solenoid rail so that it goes over the Sostenuto shaft.



Installing the Steinway Sostenuto Assembly (Order 70897)...

QRS Music Technologies, Inc.

Universal / Steinway Sostenuto System



Note: It is not nessessary to remove screws from the hex nuts. Components will slide off the rail when losened.

Please follow these guide lines for installation and adjustment. The suggested guide lines apply to all Steinway models as well as other piano brands.

This sostenuto system is infiantly adjustable. It is suggested that you maintain a near 50% pivot ratio. This will keep pedal stroke matched to the actuator.

When adjusting the lever or tabs losen the 4-40 screws just enough to free the component to slide on the lever. Usually a 1/2 turn or so. This will allow the tabs to slide on the lever. The lever can also slide inside the bearing. When tightening the 4-40 screws you want to lightly tighten to just snug. You may find the hex nuts want to slip inside the extrusion. Simply lifting the tabs upward to apply drag on the nut or use a small screw driver in the slot to prevent the nut from initially slipping. Again, do not over tighten the screws.

Find the optimum position for the pivot point of the lever and fix the bearing mount at this point with the #10 x 1" screws. To access the #10 screws remove the tabs from the rail and slide the lever through the bearing. It is not necessary to remove the lever. Just slide the lever out to the end to provide access to the screws.

Generally it is recommended that the lyer brace be moved toward the front of piano by 1.25" to provide space for player hardware. Ultimately the installer must decide what modifications are necessary for a given piano .

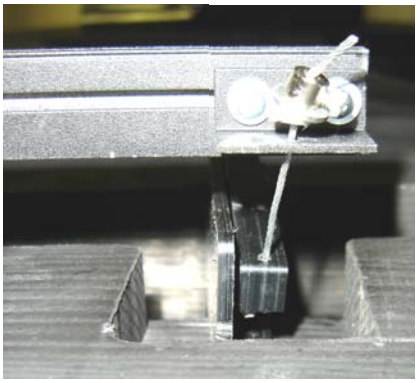
It is important that the link tab is positioned directly under the actuator. Avoid pulling the link cable from severe angles.

This system allows for a custom length lever. Once the lever system is installed excess length can be cut off the lever ends to prevent interference.

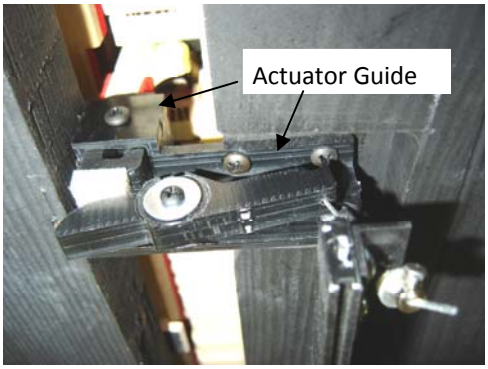
Installation Procedure

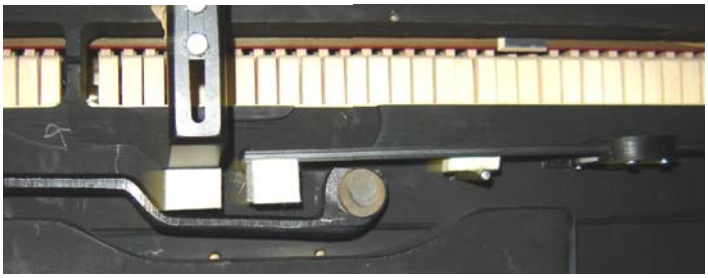
...Installing the Steinway Sostenuto Assembly (Order 70897)

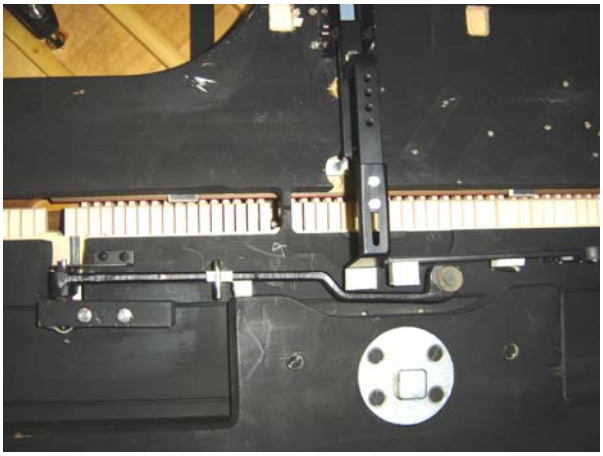
Route out the Sostenuto actuator pocket, centered on the original dowel hole, 2” x 2”.



The depth is dependent on the key bed thickness but, the monkey must be able to slid over the actuator guide.





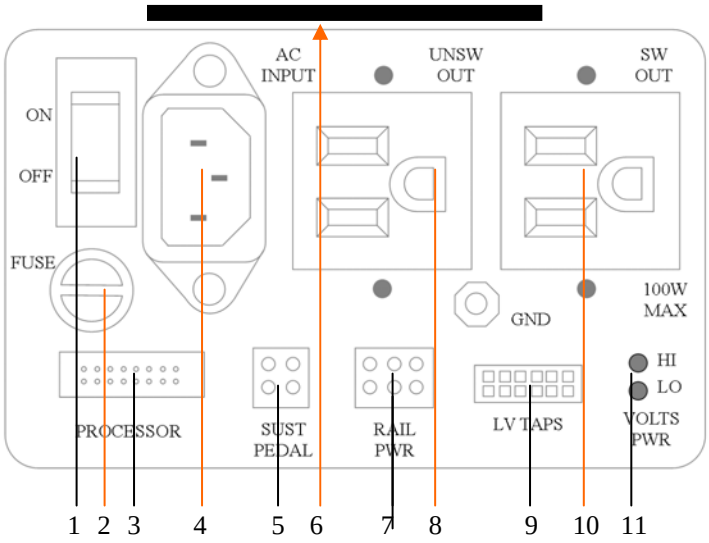


Mounting & Connecting the Electronic Components

Electronic Components - Description...

Power Supply Description

1	ON/OFF Main Power Switch The UNSW OUT socket is “hot” when switch is ON
2	FUSE: 7amp 250 volt
3	Processor - Ribbon Power Cable to PMII
4	AC INPUT - From home’s AC Outlet
5	SUST PEDAL - To Sustain Pedal Solenoid
6	Mounting Bracket Can be also be mounted to the short side of the chassis
7	RAIL PWR - DC Power Harness cable to Driver boards
8	UNSW OUT - Un-switched AC Out (To Wi-Fi device)
9	FOR FUTURE USE
10	SW OUT - To Speaker “Hot” only when HI light is ON
11	LO/HIGH volt LEDs. Both LEDs must be out before connecting or disconnecting cables



NEW! Driver Board Description

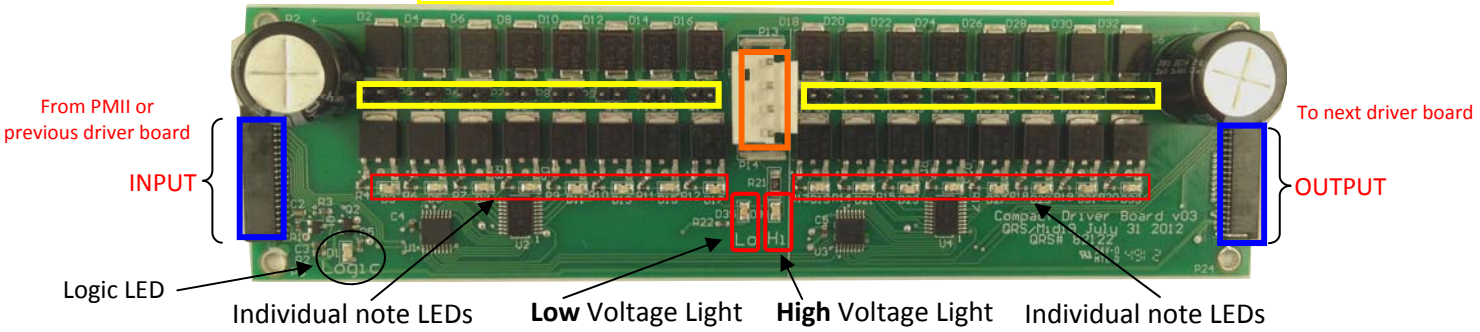
There are five Key Note Driver Boards used in the Pianomation System.
They are all identical and can be interchanged, if necessary.

Do Not connect or disconnect any cables when the lights are on!

Notice Input and Output connectors! Input is near the “Logic LED”
“Input” must be connected to PMII’s Driver Port A or previous driver board.

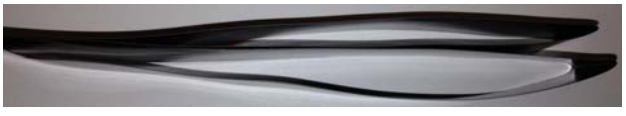
Four pin male connector / Connect Note Driver Power cable 811437 - From Power Supply Rail Power

Connect Key Solenoids to these sixteen 2-pin connectors



Ribbon Cable Connectors / Connect Note Driver Ribbon cables 82126, 82127 & 82128
From PMII Driver Port A to bass end board and then chain other boards together

Do Not Fold Ribbon Cables!



Mounting & Connecting the Electronic Components

...Electronic Components - Description

PMII Processor Description

The new PNOmation II processor replaces both the traditional QRS processor and the QRS user controller. The entire QRS Music library can be put on an SD memory card and inserted into the PMII unit. Control of the system is best achieved when connected via a standard wireless access point and an iPad or Android device.

PNOmation II Processor with the SD Card Music Library, Mounting brackets and screws

Pin-Light Extension (PLx) Description

The PLx box is used to extend two of the USB ports and two of the audio ports from the PMII processor to an easily accessible location under the keybed. This box is also used to show the status of the system.

Pin-Light Port Extender [PLx] [Six Lights; IR Sensor; Stereo & USB Ports; Microphone; Reset Button]

Wi-Fi Device Description

The Wi-Fi device is the wireless link between the PMII processor and the iPad control device.

Universal power adapter (5V/1A, 100V~240V)

Cables: USB A to wireless power jack and RJ45 Ethernet

Velcro Strip [Use to attach Wi-Fi to beam or back post]

Powered Speaker Description

A powerful amplifier with discrete output devices providing peak power output of 35 watts when used on 115 AC volts.

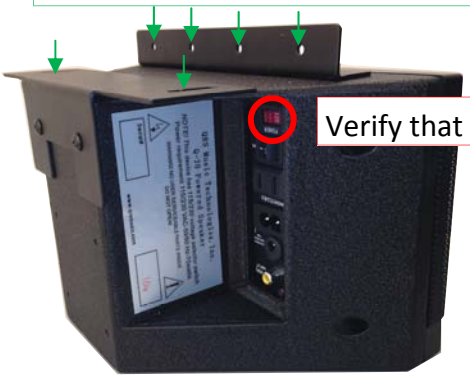
An automatic on/off circuit, activated by an audio signal. The speakers will mute one minute after the music stops.

A tri-state power indicator with pilot LED to indicate the power "on" condition in full brightness, "stand-by" condition in half brightness, and "off" condition with no brightness.

Treble and bass controls which allow you to adjust the treble and bass to cope with a particular listening environment.

A simple, yet versatile, mounting bracket is supplied for mounting the AR speaker under your piano.

Attach speaker to piano beam using six screws

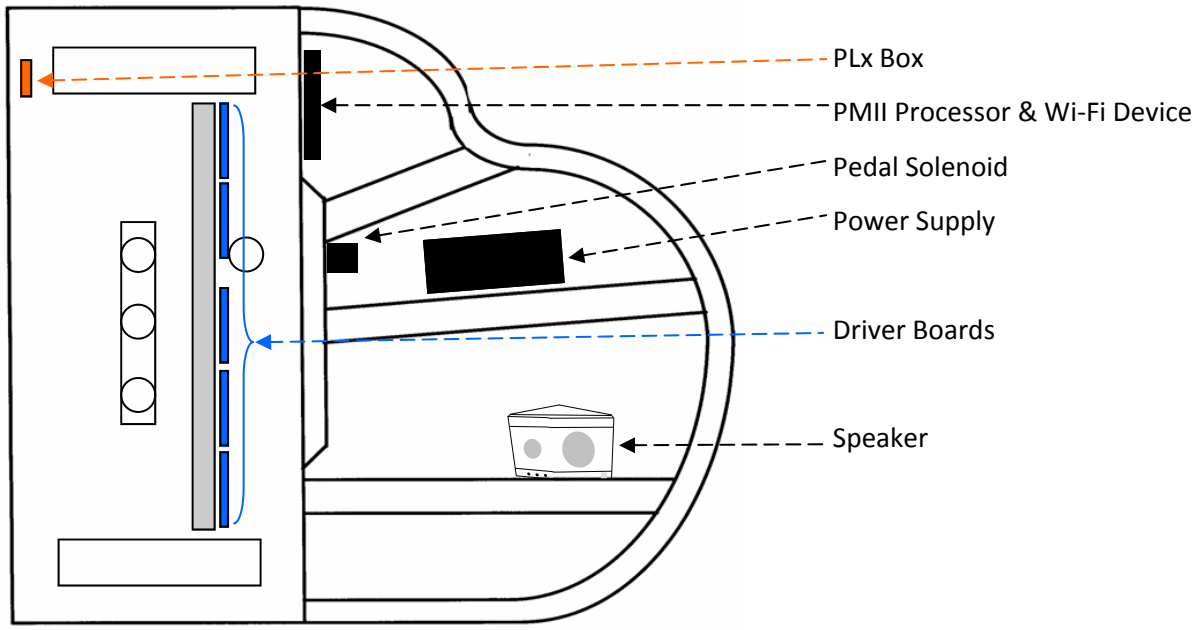


Verify that the red line voltage switch is set to 115

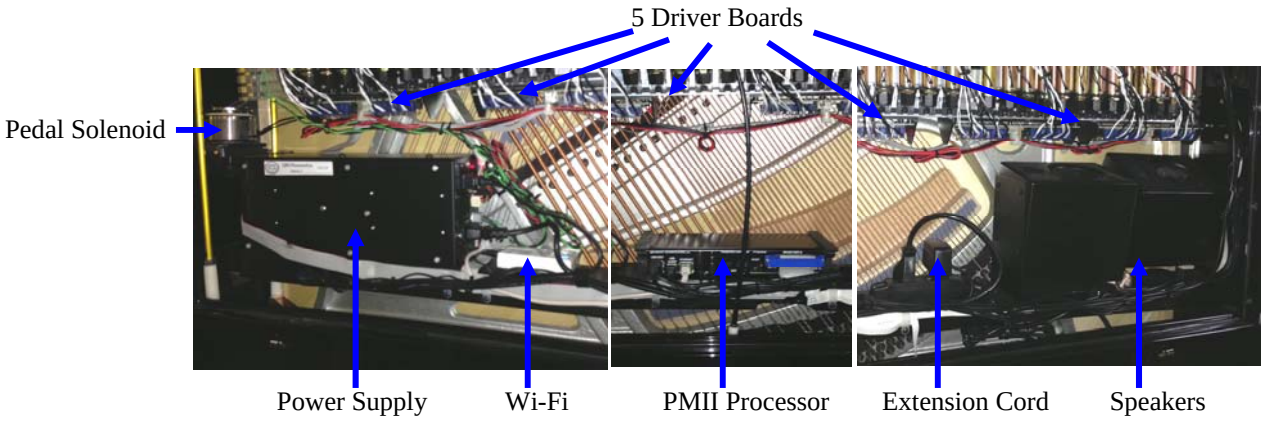
Mounting & Connecting the Electronic Components

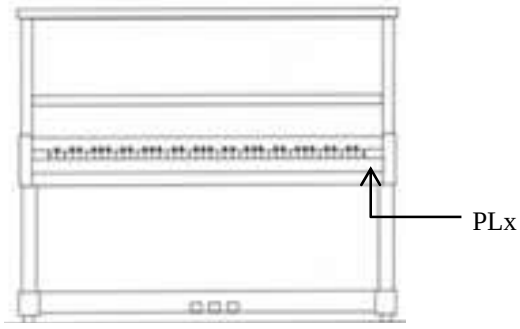
Component Location - Grand

At this point the piano is still on its side. The optional sustain pedal solenoid is in place. All the trapwork modifications have been completed and a clear passage has been made for installation of the solenoid rail. The following is the SUGGESTED method of mounting the electronics. Keep in mind every piano will be unique, and may require some parts mounted differently.



Component Location - Upright





Mounting & Connecting the Electronic Components

Mount the Power Supply

Having located the sustain pedal solenoid assembly, you can now locate the Power Supply chassis on the side of an adjacent wooden beam beneath the piano's soundboard. You should attempt to locate the Power Supply chassis as close to the belly-rail as possible so as to avoid exceeding the length of the related cables. The mounting can be placed on either the wide or narrow side of the power supply.

Mount and Connect the PMII Processor and the Optional PNOscan (Record)

Mounting the new PNOmation II processor to the piano and connect these cables.
The DRIVER PORT A socket MUST within 30" of the INPUT of the first Driver Board.

- "DRIVER Port A" [This is the new flat black cable going to the driver boards]
- "POWER SUPPLY" [This is the 3/4" flat gray cable going to the power supply]
- "KEYSCAN PRIMARY" - QRS PNOscan Record Systems Only -
  Black flat cable coming from the record system's Soft-Shift circuit board.

Mounting Brackets

Mount and Connect the Wi-Fi Adapter and Speaker

Plug the wireless power adapter into an AC outlet. There are two possible locations:

The un-switched outlet [UNSW OUT] on the type A power supply, if it's not being used.

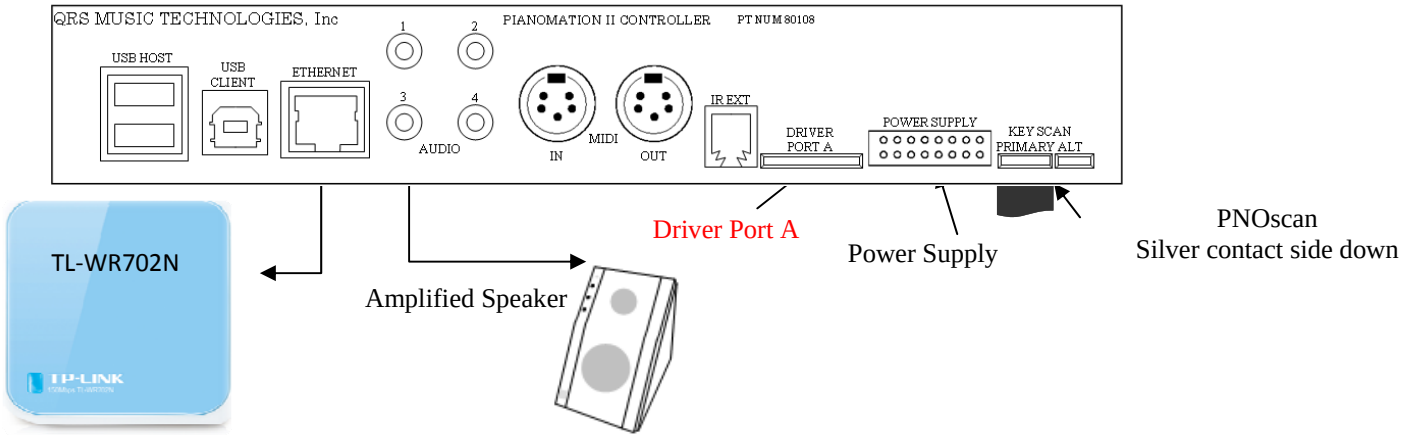
or

The extension cord from the wall outlet that runs inside or under the piano.

Connect the Ethernet cable from the wireless to the Ethernet port on the PMII processor.

Using the Velcro strip supplied, attach the wireless unit to the piano .

Connect your powered speaker to the PMII's Audio #3 jack. *Use the 1/8" stereo-to-RCA cable provided.*



Mounting & Connecting the Electronic Components

Mount the PLx (Pin Light Extension)

The Pin-Light Extension serves several functions:

- Six lights will display valuable information about your system.
- The built-in IR Sensor will allow you to use your existing QRS Remote to control PMII.
- USB A- USB Mini B & 1/8" stereo jacks extend the ports from PMII to an accessible position on the piano.
- The button is for Play / Stop / Standby and Reset.

Mount the PLx unit under the keybed at the treble side of the piano.

Connect one end of the 6-pin flat ribbon cable to the PMII's "ALT" port. *The black side of the cable faces the word "ALT"*

Connect the other end of the 6-pin flat ribbon cable to the PLx connector. Connect so t*he black side faces the ceiling.*

Connect the USB A Male cable to one of the USB Host sockets on the PMII.

Connect the other end of the cable, USB 5-Pin Mini B, to back of the PLx.

PMII Updates & Music Source

Connect the USB B Male cable to the "USB Client" port o the PMII.

Connect the other end of this cable, USB A Male, to the back of the PLx.

Computer

Connect one end of a 1/8" audio cable to the PMII's Audio #1 socket.

Connect the other end [Use Adapter] to the last 1/8" socket of the PLx. *PMII External [AUX Line Input] Source.*

Audio #1

AUX Line In

Connect to home stereo system. Mixes Synth Piano with Audio.

NOT YET Functional as of Driver version 3.93

Audio #2

Mixed Output

Main Audio Output

Audio #3

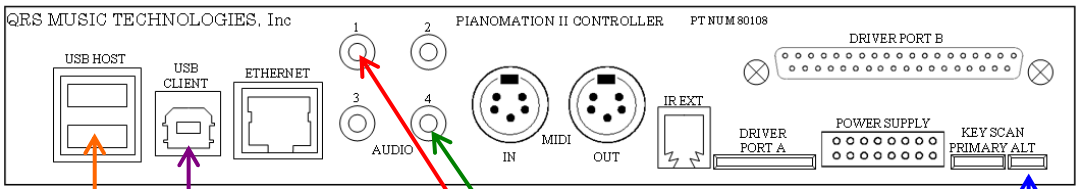
QRS Speaker

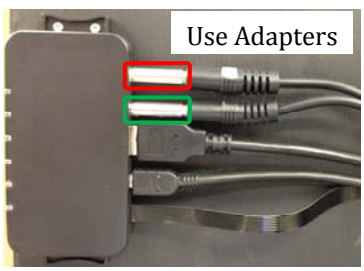
Connect one end of a 1/8" audio cable to the PMII's Audio #4 socket.

Connect the other end [Use Adapter] to the remaining 1/8" socket of the PLx.

Audio #4

Headphone





PLx Rear

An additional USB A to USB Mini B cable is provided for user to connect to computer for recording purposes. *A record system is required.*

ON/Standby Button
Play / Stop / Reset

PLx Front

Lights: Power/System/Network/Mode/MIDI/AMI

Mounting & Connecting the Electronic Components

Mount the Key Solenoid Rail

At this point, the rail has solenoid assembly pairs corresponding to active keys at either end of each action section and the rail has been previously cut to length. The piano is on its side; all of the electronics, mounting hardware and trapwork are in place and functioning.

Since the piano is resting on its left side, you can install the key solenoid rail easily by resting the bass-most (that is, the lowest) portion of the rail on the lowest end of the lowest slot and then bringing the treble-most part of the solenoid rail into the higher slots. The external parts of the rail assembly will take the brunt of the weight of the key solenoid rail and spare the more fragile internal structures. You can use a heavy-duty screwdriver inserted between the bass-most aspect of the lowest slot and the lowest part of the rail assembly as a simple wedge-lever to fine-tune the rail's precise alignment within the slot-system. Look inside the keyboard compartment to observe the alignment of the solenoid plungers alignment with their respective key-tails. If these are not satisfactory, you will have to remove the key solenoid rail assembly and place it back on the workbench in front of the keyframe-with-keys to correct any misalignment.

Once you are satisfied with these adjustments and the rail is properly aligned within the keybed slots, take a spring-loaded center punch or a sharp awl and carefully mark the centers of the four corner brackets, in the larger of the two holes in each bracket.

Next, fasten the four alignment screws with the large washers. This will allow you to move the solenoid rail 1/4" in all directions for fine alignment.

NOTE: The solenoid rail can be installed easily and more accurately when the piano is on its legs and the action is in place. However, an assistant may be required to hold the rail while it is being fastened to the keybed for this step.

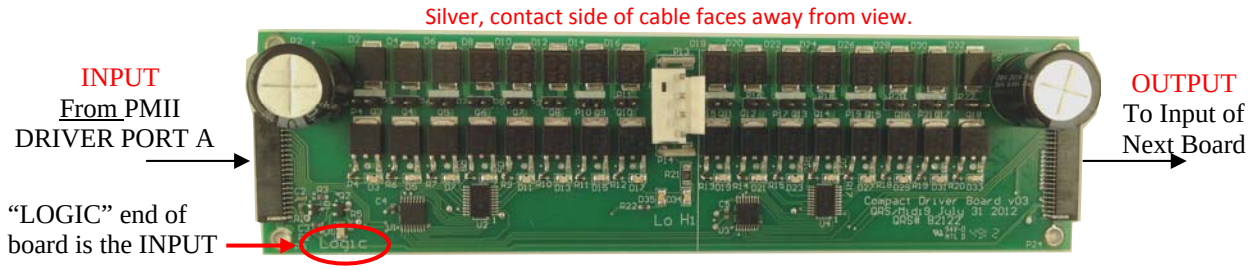
In the case of uneven keytails, a lost motion adjustment can be made for each individual key. Each solenoid has a 5/8" nylon cap at the bottom of the solenoid. With the 5/8" socket wrench turn the nylon cap clockwise to raise the plunger tip or counter clockwise to lower the plunger tip.

Mount and Connect the NEW Driver Boards

There are 5 Note Driver Boards, 2 Aluminum Extrusions and 5 Black Ribbon Cables [30” x 1, 14” x 1 & 4” x 3] in the kit. You will slide the driver boards into the grooves of the extrusions and then mount the extrusions to the keybed. Before mounting, you will want to find locations for the two extrusions so that all of the cables will reach.

1] Connect the 30” ribbon cable from PMII Driver Port A to the INPUT end of the first driver board, bass or treble.

2] Connect the other boards with the cables provided. The 14” cable is used to connect between the two extrusions.



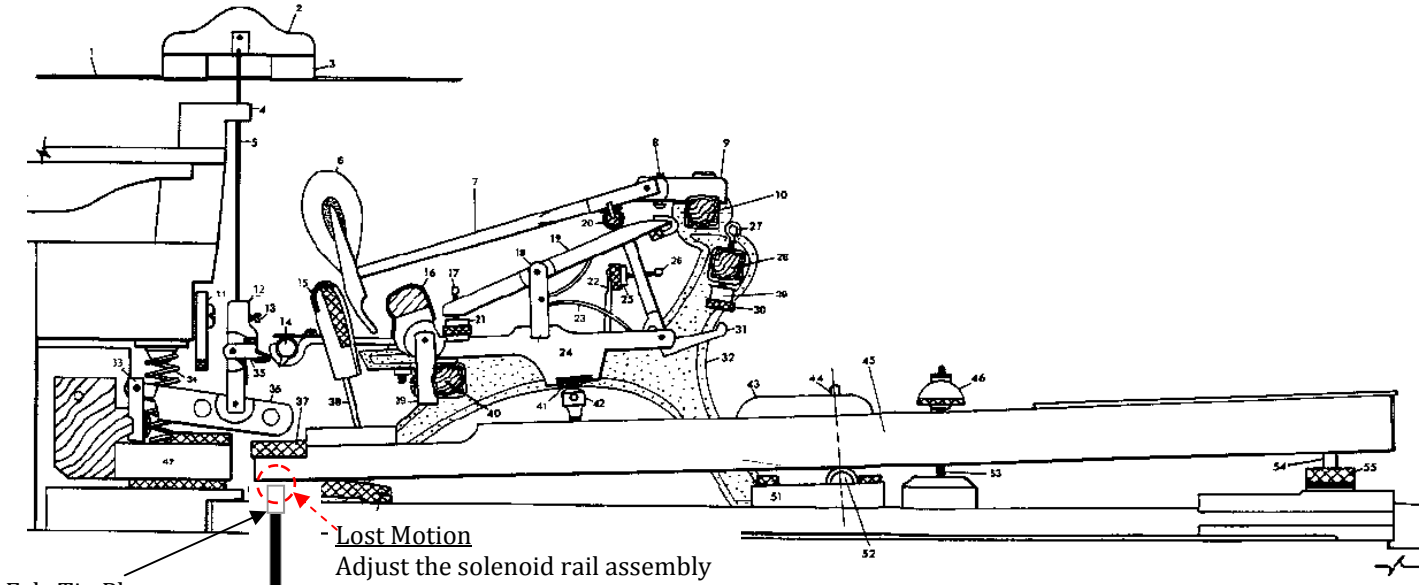
Each 16-note driver board has 16 pairs of header pins, one header pair for every note. Start with the lowest key solenoid plug and plug it onto the lowest (that is, the left most) header pair. The next key solenoid plug should be the opposite wire color and it goes onto the next higher header pair. Continue this process for all 16 pair-positions on each board (Note: if there is a single solenoid at a break, there may be a wire color change.).

At this point, all boards have been mounted and connected to their respective key solenoid. Also, all electronic components, solenoid rail, and trap work have been mounted to the piano.

Adjustment Procedures

Lost Motion Adjustment: Plunger-Tip to Keytail Height

Don't confuse Lost Motion with the Plunger Throw adjustment!
The Lost Motion is the space between the tips of the plungers and the bottoms of the keytails.
Raise or lower the Key Solenoid Rail Assembly so that the plunger tips are as close as possible to the keytails without touching.



Lost Motion
Adjust the solenoid rail assembly

Felt-Tip Plungers

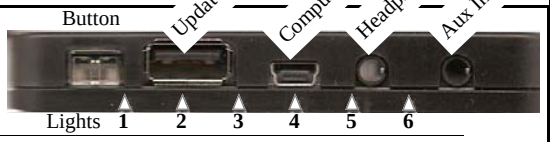
Solenoids
Fully encased solenoids with a unique metal alloy inner sleeve specially designed for PNOmation. Built to hold tolerances of commercial applications and environments.

Teflon Impregnated Plungers
Won't Corrode / Non-Sticking / Self-Lubricating
Don't lubricate, just wipe with a dry cloth.

Plunger Throw Adjustment

Introduction to PNOmation II "PMII"

PLx Box "*Pin-Light Extension*" - What is the status of the system?



The PLx box should be located under the piano near the edge for easy visibility.
Contact your dealer or installer if you cannot locate this box.

The six lights will give you important information about the system before connecting to PMII.

The four sockets [two USB & two 1/8" stereo Audio] "Extend" the PMII ports for easy access.
Large USB - **Update PMII** & External **Music** Access / Small USB - Record to **Computer**, pianos with optional record.
Audio 1- **Aux In**: External Music Access / Audio 4 - **Headphones**

The button has multiple functions. [Power ON, from "Standby", Start & Stop Play]

Network Mode - How are going to connect to PMII?
Use **qrspno.local** instead of the IP address in either Stand Alone or Network modes

Stand Alone - No connection to the Internet.

The user wirelessly connects to QRSPNO#### and PM II delivers the IP address and control on Google Chrome, Safari or Android web browser, at the IP address of 192.168.1.1 or qrspno.local
PM II and the users Wi-Fi device communicate only with each other.
In Stand Alone mode the third PLx light is green.

Network - Connection to the Internet, the *preferred operating mode. Connect using qrspno.local*

The Wi-Fi device under the piano is programmed to connect to the users home network.
Wi-Fi devices we provide will NOT connect to a 5GHz home router.
PM II is programmed to get an IP Address from the home router.
In Network mode the third PLx light is yellow.

Network Mode Advantages:
The Wi-Fi control device, iPad, can be connected to the Internet and still control PM II.
Register, Place Music Orders and Update PMII directly through the internet.

Voice Prompts

We send a number of voice prompts to the speaker.
System status, Version #, IP address can be heard during the power on sequence and from QRS remote control commands. The speaker must be on to hear these prompts. We normally connect the speaker to a switched outlet so that it is off when PMII is in Standby mode. If the first PLx light is yellow, press the PLx button once so the first light is green. To test, press any one of the numbered buttons on the QRS remote control.

Connecting to PMII

It's always a good idea to look at the PLx lights, especially if you can't connect.

The second light should ALWAYS be green. You won't be able to connect to PMII if the second light is yellow.
If it's not green, unplug the piano from the AC wall outlet, wait a few minutes and then reconnect to power.

Connect your wireless device to the Wi-Fi that you are using, either QRSPNO#### or your home network.

Go to your web browser and enter qrspno.local, 192.168.1.1 or the address provided by your home router.
Multiple PMII pianos, set up for Network Mode and using the same local network, cannot use qrspno.local to connect.

Trial Activation: 90 Day Trial Period

Don't forget to create an account to receive your 90 day access to the entire QRS music library.

Connect to the piano, not the QRS website, and go to System Setup / Trial Activation.
Press the green Customer Activation button, fill out the form and then press the Save button.

Purchasing Music

Select the music you want from the Sample Library and go to the cart. The cart will give you the numbers needed to place your order. Call QRS at 800-247-6557 or just press "Purchase Music" / "Place Order" to send via email. Once the order is processed go back to the cart and press "Enter Release Key" and enter the Release Key given by QRS.

Check for PMII updates

For best performance please keep your PMII system updated to the latest Software Driver Version. Connect to your piano and go to Information / System for your current version. Download the latest at http://qrsmusic.com/support_pmii.asp

Adjustment Procedures

Wirelessly Connect to PMII and Power ON

Check the status of the system by looking at the lights on the PLx box.

If all of the lights are off, the power is probably disconnected

Plug the AC power cord into a wall outlet.

When the piano is plugged into the AC wall outlet….
The lights will scan while the operating system loads and the music is indexed.

Stand By - #1 light is yellow.

No power to move the keys and the speaker is off.

Low Voltage Power - #2 light must be green for the system to operate.

If it's yellow the system has shut down and you must recycle the power.

Stand Alone Mode- #3 light is green.

All units are shipped from the QRS factory in "Stand Alone" mode.

If #3 light is yellow, and the #2 is green, the system is in Network Mode use a QRS remote to change to Stand-Alone.

Press the following buttons in sequence…
SHIFT FUNC 9 9 0
The third light should be green.
Press SHIFT INFO to confirm the 192.168.1.1 address.

Connecting into PMII - Two Steps

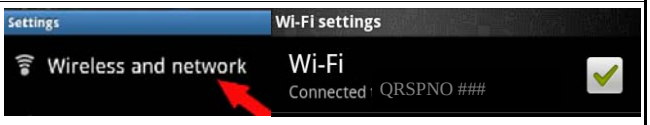
1

Wirelessly connect your device to the piano's Wi-Fi Adapter.

iPod Touch / iPhone / iPad
Go to Settings / Wi-Fi
Select "QRSPNO ####"

Computer [*Windows 7 example shown*]
Click on your Wireless Network Connection Icon.
Select "QRSPNO ####"

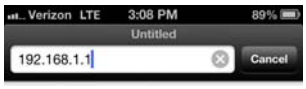
Android
Go to Settings / Wireless Networks / Wi-Fi
Connect to "QRSPNO ####"



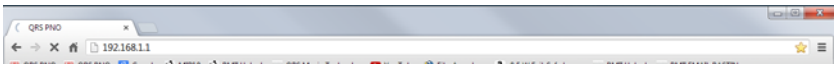
2

Enter 192.168.1.1 or qrspno.local in the address box of your browser window, then refresh the browser.

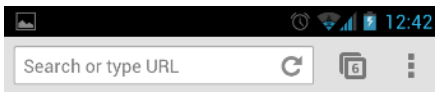
iPod Touch / iPhone / iPad
Safari



Computer
Use Google Chrome



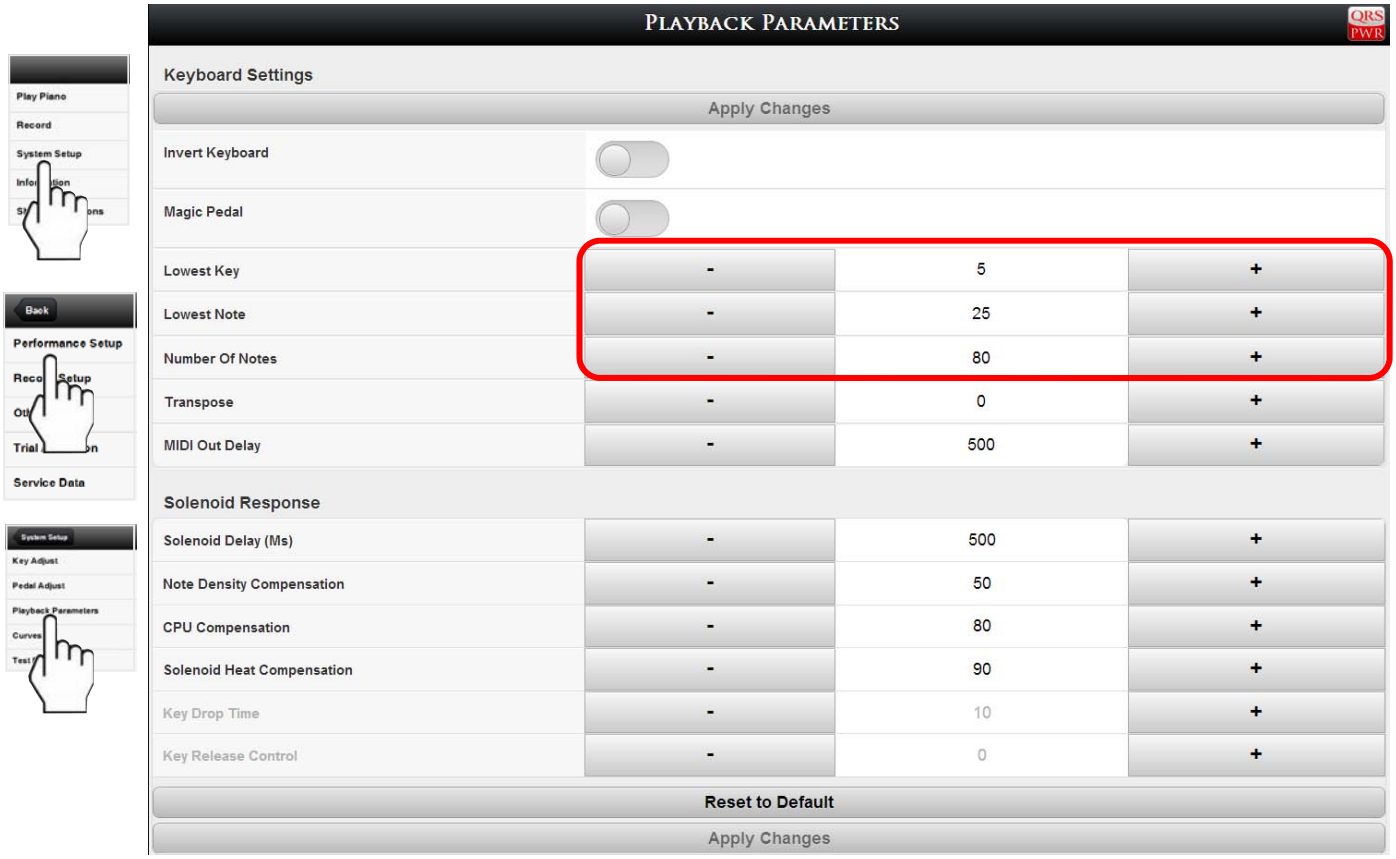
Android



Press the "Power ON" button.

Adjustment Procedures

Playback Parameters



Invert Keyboard: *Shown OFF, for Grand's* Reverses the direction of play, usually on, as shown, for upright pianos.
Magic Pedal: *Shown "OFF"*
Lowest Key: Set to 5 for 80 note systems and 1 for 88 note installations.
Lowest Note: Refers to MIDI. Set to 25 for 80 note installations.
Transpose: Set to 0.
MIDI Out Delay: Sets the piano delay of the 5-Pin MIDI Out socket. Default = 500.
Solenoid Delay (Ms): Sets the piano delay to the driver boards. Default = 500.
All other settings are reserved for QRS system set-up and should not be changed by user.

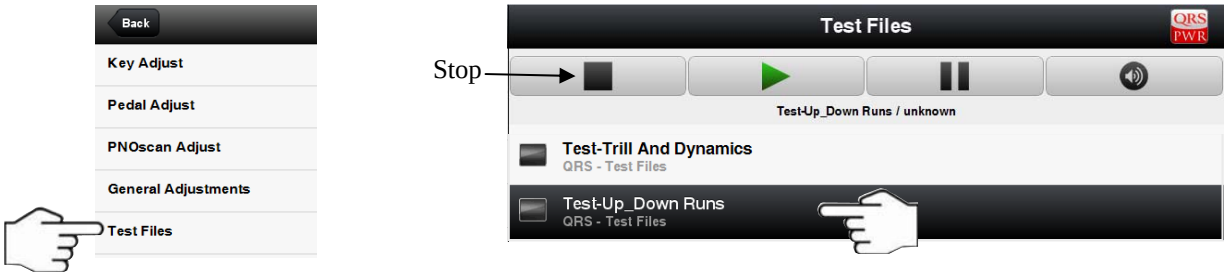
Adjustment Procedures

Key Adjust

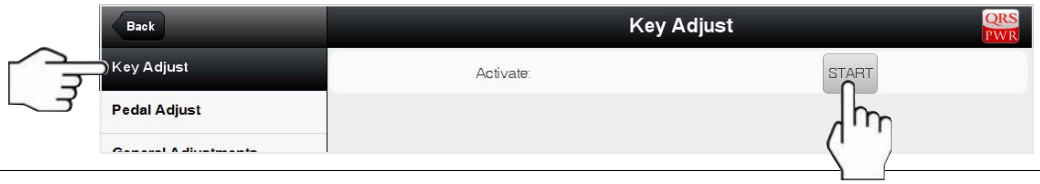
The key adjustment sets the minimum force for each key.
There is no “save” button. Your changes are automatically saved to memory.

Press “System Setup”

Press “Test Files” then “Test-Up_Down Runs” for a warm-up before adjusting key levels.



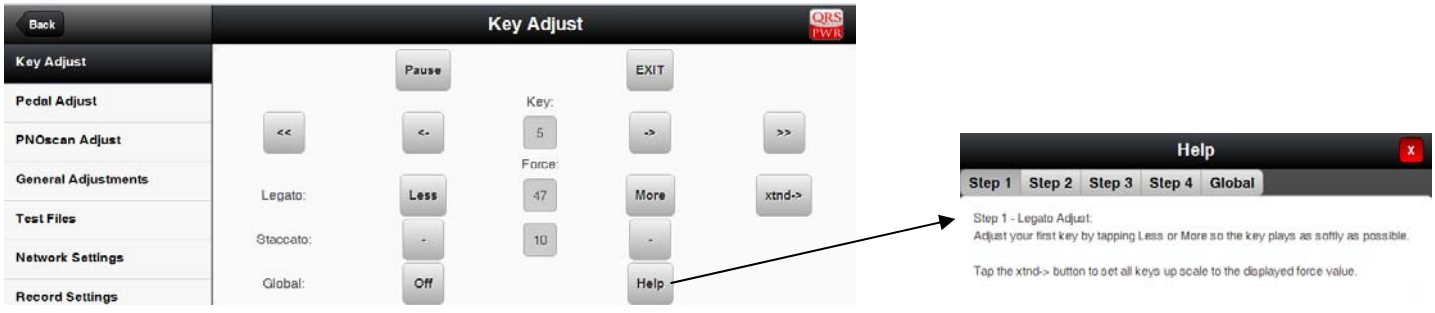
Stop the Test File. Press “Key Adjust” and then the “START” button.



Piano key #5 should begin to repeat. [*Key #1 for 88 note systems*]

You must set the Legato AND Staccato Force levels for each key.

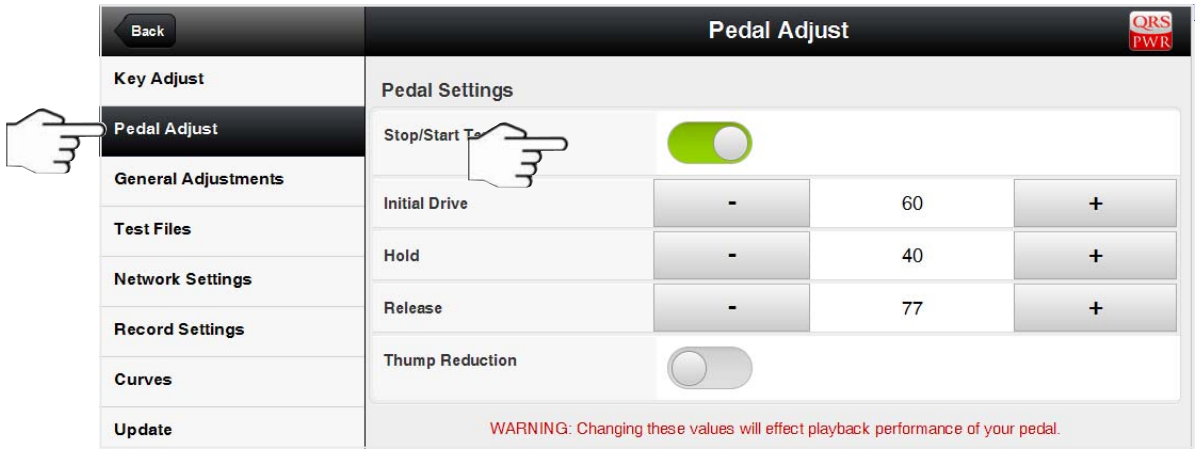
Set the Legato adjustment first.



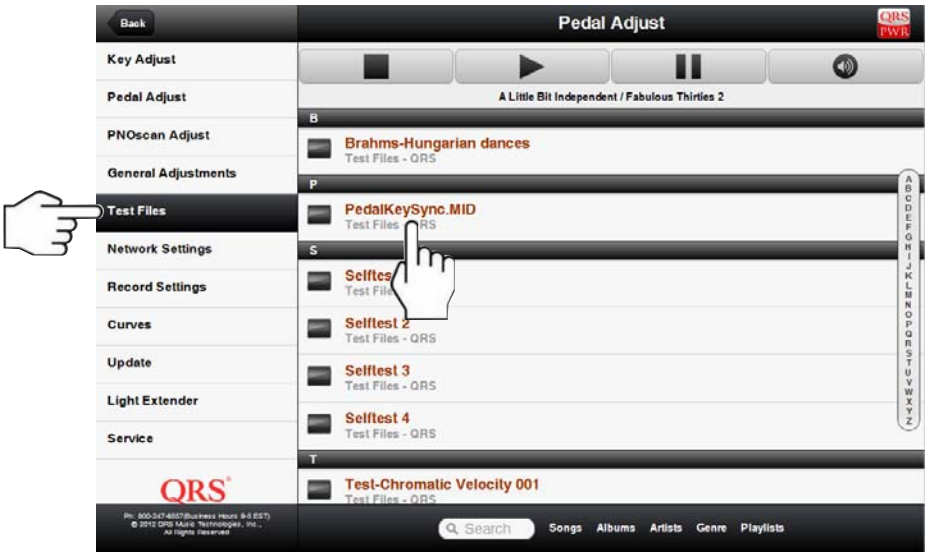
<- 5 ->	Previous Key / Key Number / Next Key
Less 44 More	Key “Force”: Legato & Staccato. Adjust so key plays as softly as possible.
xtnd->	“Extend”: Sets the Force value “displayed” to all notes <u>upscale</u>.
Global	Clicking “More” or “Less” increases or decreases the force for **<u>ALL</u>** Keys.
	Entering a number in the force box sets the Key Force value entered to **<u>ALL</u>** Keys.
<< >>	Chromatic Scale: Down/Up. Use as a final test.
EXIT	Please press the EXIT button when finished. Otherwise the note will continue to play.

Adjustment Procedures

	Pedal Adjust
	This procedure is not necessary on systems that do not have a sustain pedal solenoid, usually uprights .
	Press “Pedal Adjust” and then slide the “Start/Stop Test” button to the right to start the adjustment.
	The sustain pedal solenoid and the sustain dampers should start to cycle ON and OFF.
	Turn OFF the “Thump Reduction” by sliding the button to the left.
	Press the “-” buttons to set the “Initial Drive” and “Hold” values to zero.
	Watch the sustain dampers and press the Initial Drive’s “+” button until the dampers move off the strings.
	Then, press the Hold “+” button until the dampers lift up and hold off of the strings.
	Turn ON the “Thump Reduction” by sliding the button to the right. Thump reduction will pulse the pedal solenoid as it’s release to break it’s fall and reduce noise.
	Adjust the release up and down until the solenoid drops quietly.
	Stop the adjustment by sliding the “Start/Stop Test” button to the left.



	Pedal Test
	Press “Test Files”
	Select “PedalKeySync.MID to test your pedal adjustment.



Adjustment Procedures

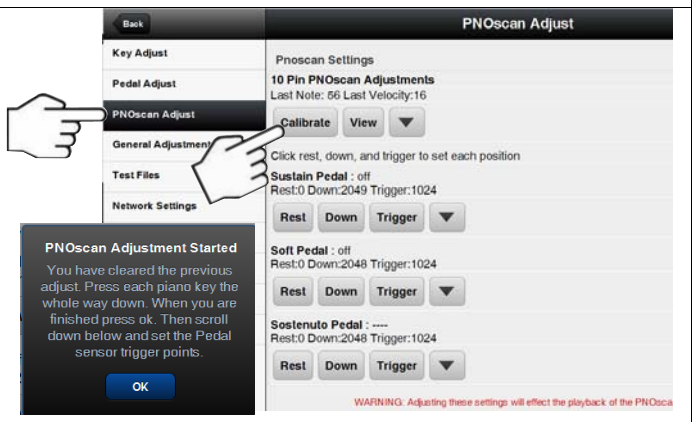
PNOscan II Adjust

If PNOmation II is connected to the QRS PNOscan II record system, as shown at the bottom of page 5, then the PNOscan Adjust option will appear on the System Setup page. The following adjustments are necessary after initial installation or when the system isn't recording properly.

Select the PNOscan Adjust option from the Home Screen's System Setup page.

Press the Calibrate button.

The PNOscan Adjustment Started box will appear. *At this point the previous calibration has been cleared.*


Back
PNOscan Adjust
Key Adjust
Pedal Adjust
PNOscan Adjust
General Adjustment
Test Files
Network Settings
Pnoscan Settings
10 Pin PNOscan Adjustments
Last Note: 56 Last Velocity:16
Calibrate
View
Click rest, down, and trigger to set each position
Sustain Pedal : off
Rest:0 Down:2049 Trigger:1024
Rest
Down
Trigger
Soft Pedal : off
Rest:0 Down:2048 Trigger:1024
Sostenuto Pedal : ----
Rest:0 Down:2048 Trigger:1024
PNOscan Adjustment Started
You have cleared the previous adjust. Press each piano key the whole way down. When you are finished press ok. Then scroll down below and set the Pedal sensor trigger points.
OK
WARNING: Adjusting these settings will effect the playback of the PNOsca

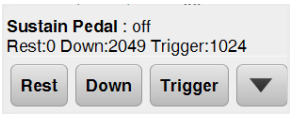
To calibrate the PNOscan key sensors you're going to play each key, in sequence, starting at the bass end of the keyboard. Watch the MIDI light on the PLx box and press the first bass-end key.

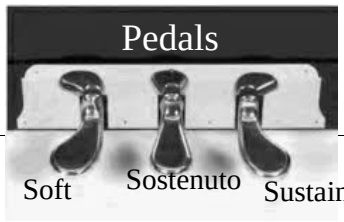
The light will flicker red indicating that the key is set.
Release the key and proceed up the keyboard.
Move to the next key when the PLx light flashes.

Press OK when finished.

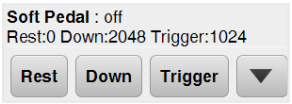
PNOscan Adjustment Started
You have cleared the previous adjust. Press each piano key the whole way down. When you are finished press ok. Then scroll down below and set the Pedal sensor trigger points.
OK
MIDI

Adjust the Sustain Pedal.
Wait for changes in the Rest, Down and Trigger values as you make adjustments.
Press the Rest button.
Depress the sustain pedal and Press the Down button.
Release the pedal and depress until the strings sustain.
Press the Trigger button.





Adjust the Soft Pedal.
Follow the same procedures above with the soft pedal.



No adjustments are necessary for the Sostenuto pedal.

The PNOscan adjustments are complete.

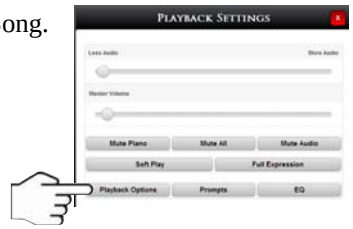
Adjustment Procedures

System Break-In

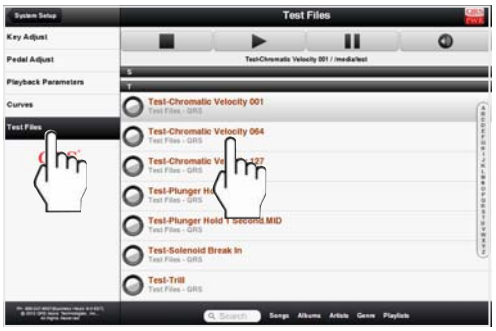
Key Solenoids

Press “System Setup”, Performance Setup, “Test Files”

Select Repeat 1 Song: Speaker Icon; Playback Options; 1 Song.

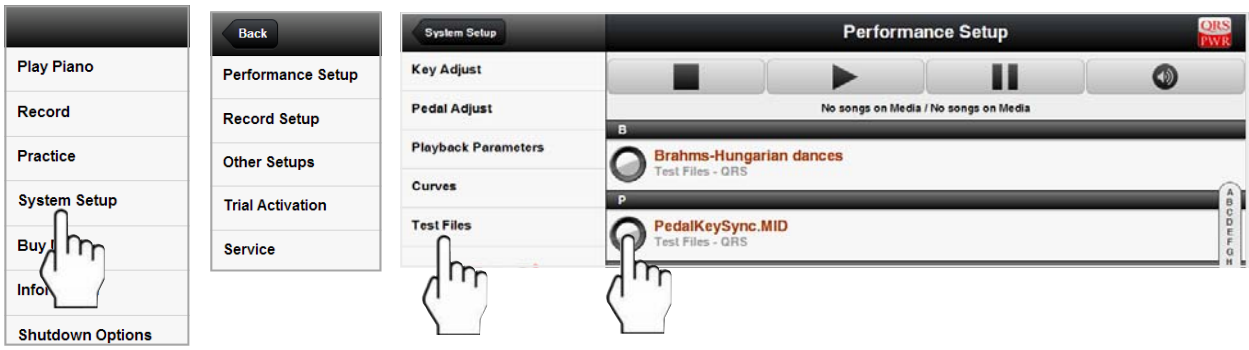


Select one of the “Test Chromatic Velocity…” test files to break-in the key solenoids.
Run this test for about 30 minutes.



Pedal Solenoid

Select “PedalKeySync.MID to test your pedal adjustment.
The sustain dampers should stay raised for about 2 seconds.



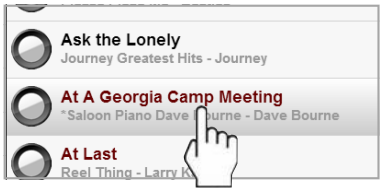
Break-In

Select “At A Georgia Camp Meeting” a song that uses the sustain pedal solenoid.

Set Volume to “Full Expression”

Repeat 1 Song

Play for at least 1 hour.



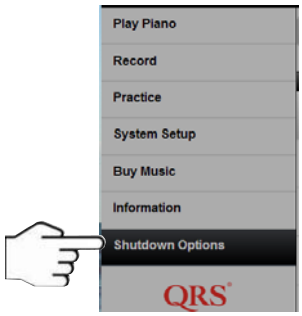
Re-Do the Key and Pedal Adjustments

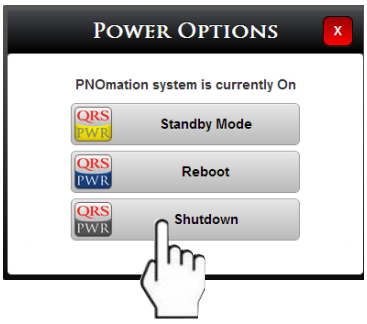
Turn OFF the 1 Song Repeat function.
Go back and run through the Key and Pedal Adjustments after the break-in period.

Completing the Installation

Install the Rail Covers

Shutdown the system and unplug the unit from AC power.



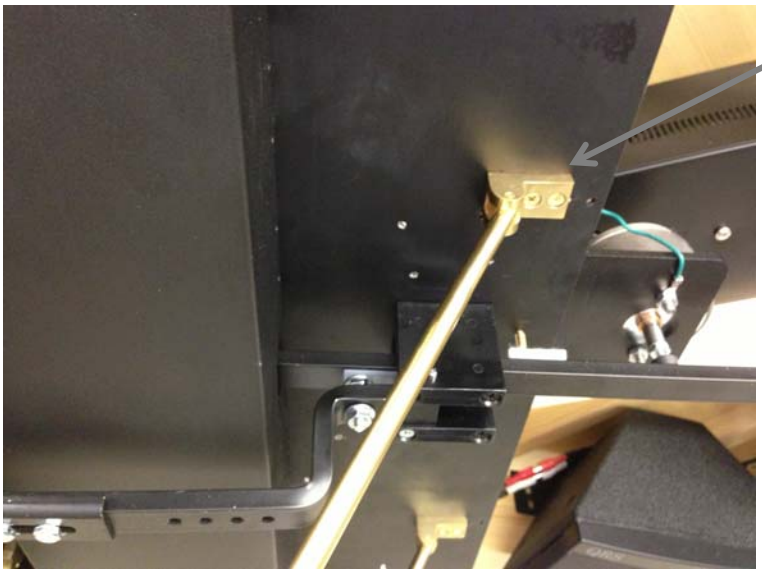


Install the two key solenoid rail covers using “L” brackets

Completing the Installation

Attach the Lyre and Braces

Locate the points on the keybed where the original braces were seated. Because the cover might be in the path of the braces to these two points, bend each brace in a gentle arc such that when the braces are placed into their seats on the lyre, their opposite ends come up just under their original mounting positions.
Measure the distance from the keybed to the brace bracket. Fill the distance with a block of the appropriate thickness, painted the color of the piano's keybed finish. Attach the blocks to the underside of the keybed with wood screws. Attach the lyre braces to the blocks.



If necessary, insert a spacer block between the keybed and the brace so that the lyre clears the rail cover.

Dress the Cables

Secure the cables using wire-ties and clamps.

Installation is Complete

At this point the installation is completed.
Power on and Play the instrument to test for pinched or disconnected cables.

User Guide - Introduction

Wirelessly Connect to PMII and Power ON

Check the status of the system by looking at the lights on the PLx box.

If all of the lights are off, the power is probably disconnected

Plug the AC power cord into a wall outlet.

When the piano is plugged into the AC wall outlet….
The lights will scan while the operating system loads and the music is indexed.

Stand By - #1 light is yellow.

No power to move the keys and the speaker is off.

Low Voltage Power - #2 light must be green for the system to operate.

If it's yellow the system has shut down and you must recycle the power.

Stand Alone Mode- #3 light is green.

All units are shipped from the QRS factory in "Stand Alone" mode.

If #3 light is yellow, and the #2 is green, the system is in Network Mode use a QRS remote to change to Stand-Alone.

Press the following buttons in sequence…
SHIFT FUNC 9 9 0
The third light should be green.
Press SHIFT INFO to confirm the 192.168.1.1 address.

Connecting into PMII - Two Steps

1

Wirelessly connect your device to the piano's Wi-Fi Adapter.

<u>iPod Touch / iPhone / iPad</u>
Go to Settings / Wi-Fi
Select "QRSPNO ####"

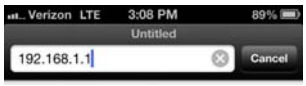
<u>Computer</u> [*Windows 7 example shown*]
Click on your Wireless Network Connection Icon.
Select "QRSPNO ####"

<u>Android</u>
Go to Settings / Wireless Networks / Wi-Fi
Connect to "QRSPNO ####"

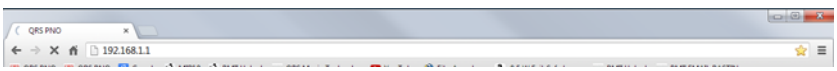
2

Enter <u>192.168.1.1</u> or <u>qrspno.local</u> in the address box of your browser window, then refresh the browser.

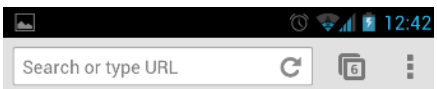
<u>iPod Touch / iPhone / iPad</u>
Safari



<u>Computer</u>
Use Google Chrome



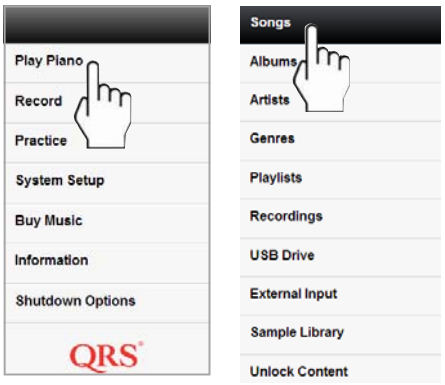
<u>Android</u>



Press the "Power ON" button.

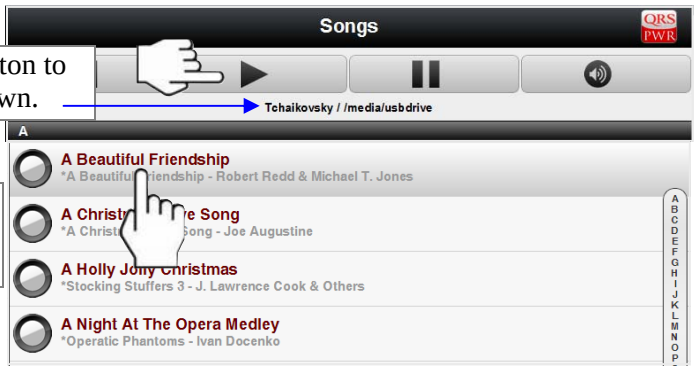
User Guide - Introduction

Play Piano



Press the play button to start the song shown.

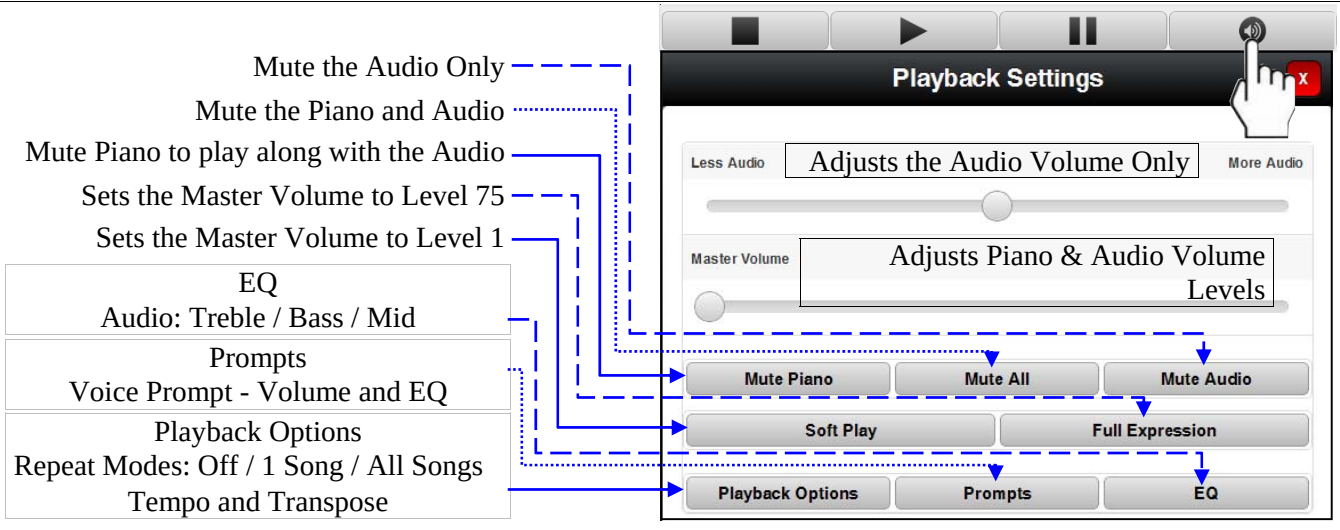
Or...
Touch the song name to play from the list.


Songs
QRS PWR
Tchaikovsky / /media/usbdrive
A
A Beautiful Friendship
*A Beautiful Friendship - Robert Redd & Michael T. Jones
A Christmas Song
*A Christmas Song - Joe Augustine
A Holly Jolly Christmas
*Stocking Stuffers 3 - J. Lawrence Cook & Others
A Night At The Opera Medley
*Operatic Phantoms - Ivan Docenko

Notice the song in the list below with an **Asterisk *** in the second line of the title.
This is a sample of a **Complimentary Song** that you receive with the purchase of the system. [318 songs]
Go to the Trial Activation section of the manual to learn how to release the entire QRS Library for 90 days.

Playback Settings

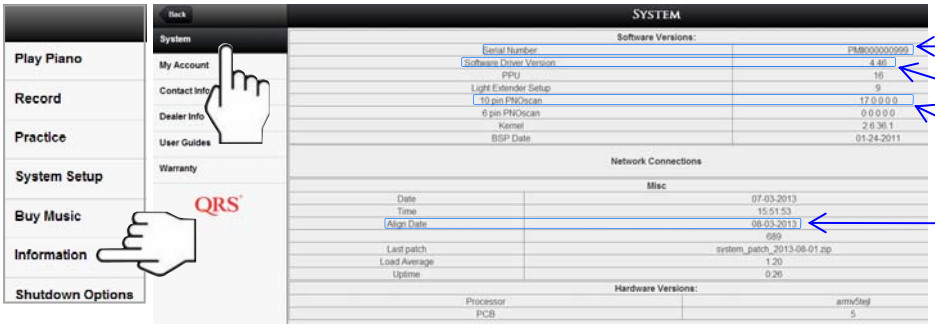
To adjust volume levels, press the "Speaker" icon to open the "Playback Settings" page.



User Guide - Introduction

System Information

Go to Information / System to view the current "Driver" version.



PMII Serial Number - *Required to Release Music*

Driver Version

10 pin PNOscan - QRS Record System
Numbers above zero indicate a record sensor strip is attached. *There is only one strip attached to this PMII*

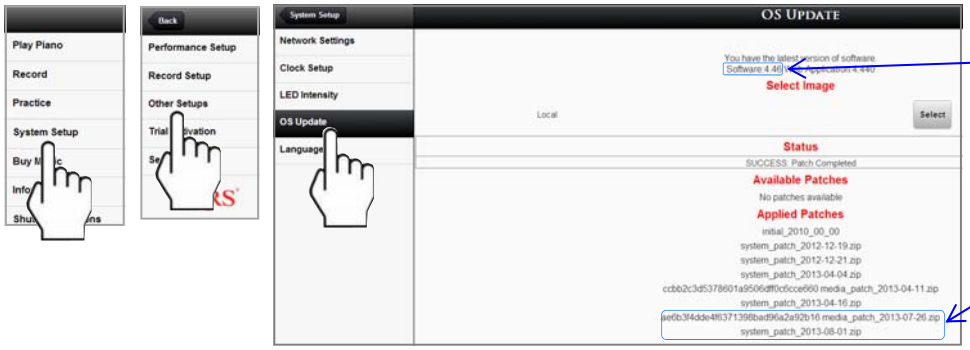
Last Key Adjust (Align) Date

Updating the Driver "Operating System" [OS Update]

Check the QRS website for the latest updates:
http://www.qrsmusic.com/support_pmii.asp
There are two update "Patches" on the website:
System and Media.

QRS MUSIC
SOFTWARE UPGRADES - SOFTWARE UPDATES/MANUALS
Updates for PNOmation II:
Media System Revision 9 - July 26, 2013
System Patch 4.46 - August 1, 2013

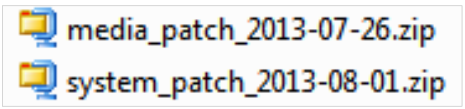
Go to the OS Update page to check your current patches and to view the update progress.



Current Software Driver

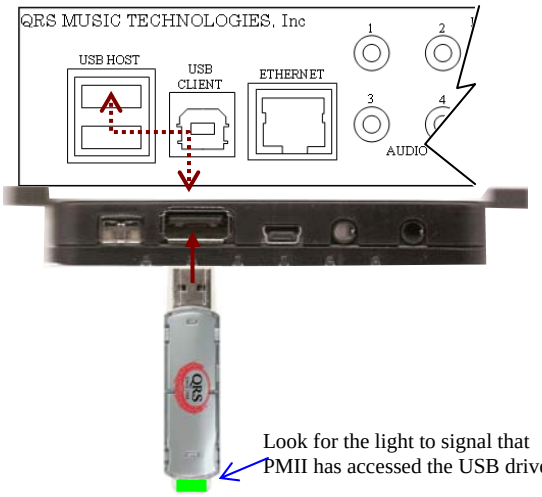
The Last Patches applied to PMII are here.
Compare the dates, they should those on the web.

If newer Patches are available, copy them both to a USB memory stick.
Don't unzip or rename these files!
"system_patch_2013-xx-xx.zip" and "media_patch_2013_xx-xx.zip"



Plug the USB memory stick in the USB port on the PLx box.

The update procedure is automatic:
- Old Patch File Found
- Copy Patch File from USB Drive
- Unzip
- Execute
- Reboot



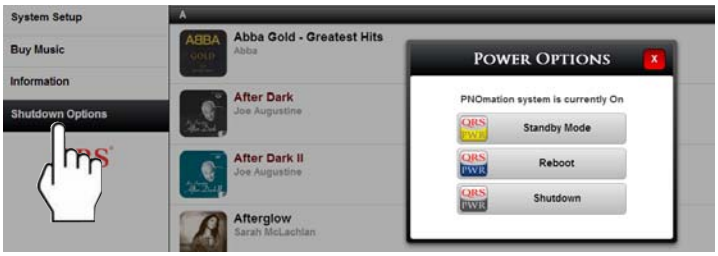
Look for the light to signal that PMII has accessed the USB drive.

Go to "Shutdown Options" and select "Reboot" and wait for system to reboot and reconnect.
Go back to the "OS Update" page and verify that the system updated to the latest patches.
Remove the USB memory stick.

User Guide - Introduction

Shutdown Options

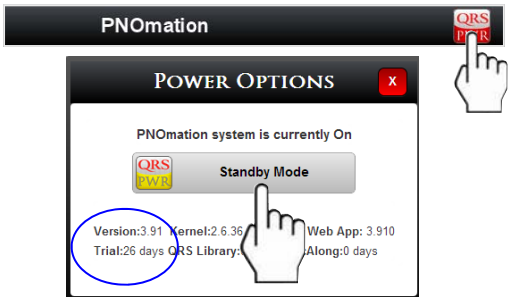
Go to “Shutdown Options”



First light is green and PNOmation is ready

“**Standby**” - Shuts off power to the key solenoids but keeps the processor running.
When you finished for the day go to Standby Mode.

You can also select the “QRS/PWR icon



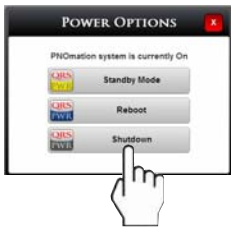
Notice Version Number & Remaining Trial Days

First light is yellow and PMII is sleeping

“**Reboot**” - Restarts the system in case the unit does not respond to commands.
Sometimes a reboot is required after a Music Release or System Update.

Scanning lights

“**Shutdown**” - Shuts OFF the system for a move or when the unit won’t be used for a while.
To restart after a shutdown the piano must be disconnected and then reconnected to AC power.



SHUTDOWN
Are you sure you want to shut down? Shut down is used before the system is going to be unplugged or power switched off. The system comes back on when power is switched back on.
Yes
No

All lights Off

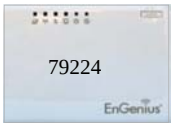
Wi-Fi Setup

Configurations for PNOmation II

Please update PMII to the latest Driver version before switching modes.

See the "Updating the Driver "Operating System" [OS Update]" section of the Owner's manual for details.

Both PMII AND the Wi-Fi device must be programmed to switch modes.	
Stand Alone	There is no connection to the Internet. The user wirelessly connects to the TP-Link (SSID = QRSPNO) and PM II delivers control on Google Chrome, or Safari, at the IP Address of 192.168.1.1. PM II and the users Wi-Fi device communicate only with each other.
	#3 Light = Green
Network	The TP-Link is programmed to connect to the users home network. PM II is programmed to get an IP Address from the local router. The advantage is that the Wi-Fi control device can be connected to the Internet and still control PM II.
	#3 Light = Yellow

79232	How to configure the TP-Link TL-WR702N from "Stand Alone" Mode to "Network Mode"	Windows 7 & Google Chrome
		iPad; iPhone; iPod/Touch & Safari
	How to Configure the TP-Link TL-WR702N from Network to "Stand Alone" Mode	Windows 7 & Google Chrome
		iPad; iPhone; iPod/Touch & Safari
	How to Configure the TP-Link TL-WR702N to Stand Alone Mode after a TP-Link Reset	Windows 7 & Google Chrome
		iPad; iPhone; iPod/Touch & Safari
	The TP-Link will NOT connect to a 5GHz home router.	
 79224	How to Reset the EnGenius ETR9330 for QRS' "Default" Stand Alone Mode:	**Contact QRS Music for these instructions**.
	How to Configure the EnGenius ETR9330 for QRS "Network" Mode:	
79224	Setup the ASUS WL 330N3G Wireless for PMII in Stand-Alone Mode	
	Setup ASUS WL 330N3G Wireless for PMII in Network Mode	
79224	Setup the ASUS WL 330gE Wireless for PMII in Stand-Alone Mode	
	Setup ASUS WL 330gE Wireless for PMII in Network Mode	
	TRENDnet	

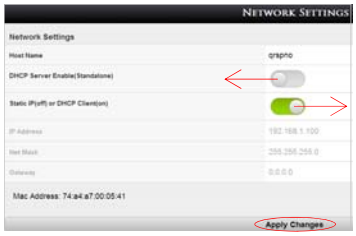
Android Device
Settings / Wireless Networks / Wi-Fi Settings / Connect to "QRSPNO"
Press the more button and select Advanced.
Select "Use Static IP" and enter the same numbers as for Apple products above.

Wi-Fi Setup

How to Configure the TP-Link: "Stand Alone" to "Network" Mode [iPad & Safari Example]

Change PMI to Network Mode

From an iPod/Touch, iPhone or iPad *Go to*...
System Setup/ Other Settings / Network Settings
Turn OFF DHCP Server Enable (Standalone)
Turn ON Static IP(off) or DHCP Client(on)
Press the Apply Changes Button
Press Yes to confirm
Press Yes again.



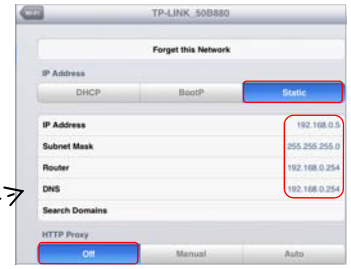
or

From a QRS Remote Control
Press the following buttons in sequence…
SHIFT FUNC 9 9 1
Third light flashes red/green and then solid yellow

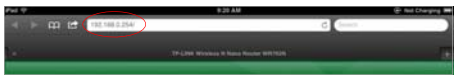
You will be Disconnected form PMII

Set a Static IP Address on your iTouch, iPhone or iPad
Select Settings and then Wi-Fi, *Turn ON if necessary*
Select and Connect to QRSPNO Stand Alone

Select the Blue Circle to the right of QRSPNO Network
Select Static
Enter the following:
IP address = 192.168.0.5
Subnet mask = 255.255.255.0
Router = 192.168.0.254
DNS = 192.168.0.254
HTTP Proxy should be OFF
Go back to your home screen…



Select the Safari browser
Enter the following address:
192.168.0.254 and press "Go"



Enter admin as the User Name and Password
Press Log In

Press Quick Setup
Press Next

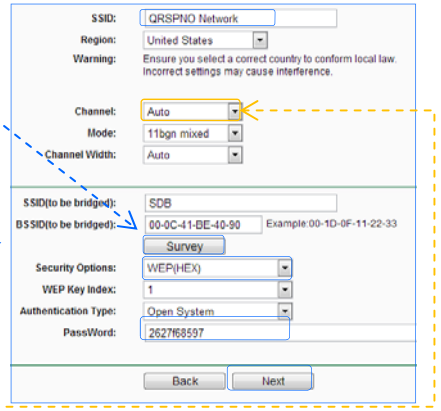
Press Bridge Mode
Press Next

Press the Survey button

Click Connect next to the network that you wish to join

ID	BSSID	SSID	Signal	Channel	Security	Choose
1	00-0C-41-BE-40-90	SDB	51dB	6	ON	Connect
2	68-7F-74-88-05-5B	RC-PC	33dB	6	ON	Connect
3	00-26-62-0E-F4-FC	GC0L0	29dB	6	ON	Connect

Change the SSID to QRSPNO Network
Set Channel to Auto
Select the Security Option type of your home network
Enter your Network Password
Click Next



You may be asked to change the channel
Note Channel #
Press OK and *Change* the Channel
Press OK and then *click* Next

http://192.168.0.254
The channel of AP you want to bridge is 6,it is different of your AP's channel, please set your AP's channel again!
OK

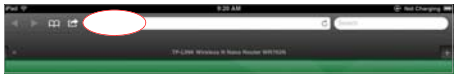
Select Disable Security
Click Next

Click Reboot
Click OK to confirm

Quick Setup - Finish
Congratulations! The Router is now connecting you to the Internet.
For detail settings, please click other menus if necessary.
Back
Reboot

The TP-Link is now linked to your home network and ready for "Network Mode" on the PMII.
If you did not hear the IP address *press* SHIFT and then INFO on the QRS remote control.
You may have to reboot PMII by unplugging from AC power and reconnecting.

Open Safari enter the IP address heard from the speaker.

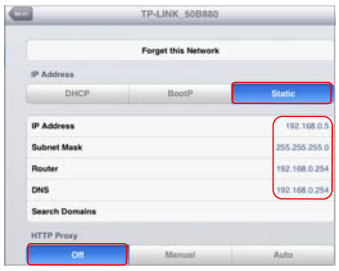


Wi-Fi Setup

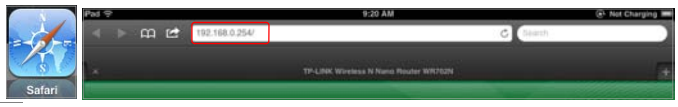
How to Configure the TP-Link: "Network" to "Stand Alone" Mode [iPad & Safari Example]

Set a Static IP Address on your iTouch, iPhone or iPad
Select Settings and then Wi-Fi, *Turn ON if necessary*
Select and *connect* to QRSP-O Network

Select the Blue Circle to the right of QRSPNO Network
Select Static
Enter the following:
IP address = 192.168.0.5
Subnet mask = 255.255.255.0
Router = 192.168.0.254
DNS = 192.168.0.254
HTTP Proxy should be OFF
Go back to your home screen…



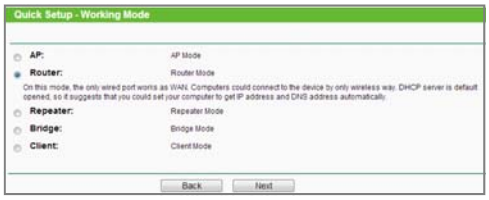
Select the Safari browser
Enter the following address:
192.168.0.254 and press "Go"



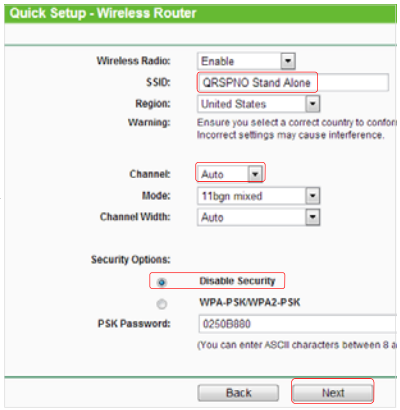
Enter "admin" as the User Name and Password
Press the "Log In" button

Click Quick Setup
Click Next

Select Router Mode
Click Next

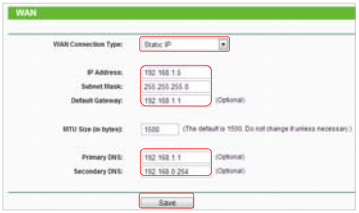


Change the SSID to QRSPNO Stand Alone
Set Channel to Auto
Under Security Options: *Select* Disable Security
Click Next



Under WAN Connection Type *select* Static IP
Click "Next"

Enter the following:
WAN Connection Type = Static IP
IP address = 192.168.1.5
Subnet mask = 255.255.255.0
Default Gateway = 192.168.1.1
Primary DNS = 192.168.1.1
Secondary DNS = 192.168.0.254
Click Next or Save

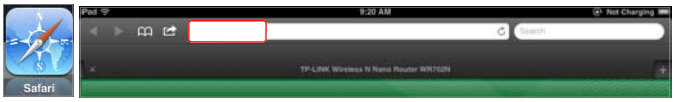


Click Reboot
Click OK
Restart - Wait for the TP-Link to finish and restart
Close browser when 100% complete

Quick Setup - Finish
Congratulations! The Router is now connecting you to the Internet.
For detail settings, please click other menus if necessary.
Back
Reboot

On the QRS PNOmation II remote control:
Press the following buttons in sequence…
SHIFT FUNC 9 9 0
The third light should be green
Press SHIFT INFO to confirm the 192.168.1.1 address

The device is now ready for "Stand-Alone Mode" on the PMII.
Select Settings and then Wi-Fi on your iPad, iPhone or iTouch.
Select and *Connect* to QRSPNO Stand Alone
Open Safari and enter 192.168.1.1



Wi-Fi Setup

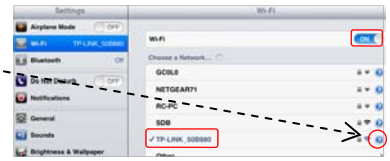
How to Recover the TP-Link: to "Stand Alone: after a TP-Link Reset [iPad & Safari Example]

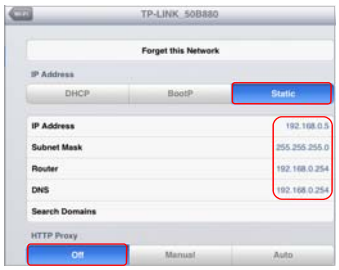
The TP-Link has been pre-programmed by QRS so it's not necessary to reset it. But, if the SSID name shown on the back of the TP-Link appears in your wireless network connection list, it's been reset. To reset the TP-Link, press and hold the "Reset" button on the side of the TP-Link for 8 seconds, or until the light blinks at lease 3 times.

Select Settings and then Wi-Fi on your iPad, iPhone or iTouch
Select and *Connect* to the TP-Link
TP-Link_50B880in our example

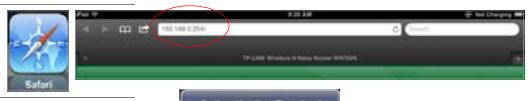
You may be asked for the TP-Link's password.
It's located on the back of the TP-Link.

Set a Static IP address on your iTouch, iPhone or iPad
Touch the blue circle to the right of the TP-Link
Enter the following:
IP address = 192.168.0.5
Subnet mask = 255.255.255.0
Router = 192.168.0.254
DNS = 192.168.0.254
Go back to your home screen…





Select the Safari browser
Enter the following address:
192.168.0.254 and press Go



Enter admin as the User Name and Password
Press the "Log In" button.

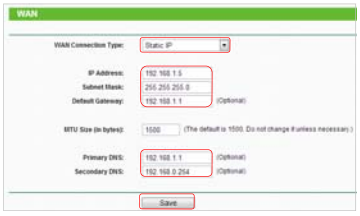
Click Quick Setup
Click Next

Select Router Mode
Click Next

Change the SSID to QRSPNO Stand Alone
Set Channel to Auto
Under Security Options: *Select* Disable Security
Click Next

Under WAN Connection Type *select* Static IP
Click "Next"

Enter the following:
WAN Connection Type = Static IP
IP address = 192.168.1.5
Subnet mask = 255.255.255.0
Default Gateway = 192.168.1.1
Primary DNS = 192.168.1.1
Secondary DNS = 192.168.0.254
Click Next or Save



Click "Reboot"
Click "OK" to confirm.
The TP-Link will configure and restart.

On the QRS PNOmation II remote control:
Press the following buttons in sequence…
SHIFT FUNC 9 9 0
The third light should be green.
Press SHIFT INFO to confirm the 192.168.1.1 address.

The device is ready for Stand-Alone Mode on the PMII
Connect to the QRSPNO Stand Alone
Open Safari and Navigate to 192.168.1.1

Other Kits

Technician's Service Kit (Item #81575)

Item #	QTY	Type	Description
50128	1	PMII Parts	Cable: 1/8" Male to 1/8" Male - 6.5'
990026	1	PMII Parts	Cable: 1/8" Male to Twin RCA - 8'
790185B	1	PMII Parts	Cable: 6-Pin black - 72"
50126	1	PMII Parts	Cable: USB A Male to 5-Pin USB Mini B Male
50141	1	PMII Parts	Cable: USB A Male to USB B Male
8152503	1	PMII Parts	Coupler, Flex Cable - 10-Pin
80124	1	PMII Parts	PLx: PMII PLP x Pin Light Extension
8152501	1	PMII Parts	Power Adapter, AC/DC PNOmation II
50139	1	PMII Parts	USB Thumb Drive with Update File
811437	1	PMM Parts	Cable, Power Supply to Note Driver Power
811433	1	PMM Parts	Cable, Processor to Note Driver Signal Ribbon
811434	1	PMM Parts	Cable, Processor to Power Supply Ribbon
8115902	1	PMM Parts	Cable, User Control Box to Processor - 6'
70072	4	PMM Parts	Cap - Lost Motion - Key Solenoid
70120	2	PMM Parts	Driver Board, 16-Note - Mounted on chassis
70570	**1**	PMM Parts	EEPROM 1.51
70084	1	PMM Parts	Felt, Key Tail 1'-1/16"
70219	4	PMM Parts	Fuse: Power Supply [70210]
702821	4	PMM Parts	Fuse: Power Supply Rev 2 [75210]
70083F	4	PMM Parts	Plunger 4.5" [Felt Tip]
70083R	4	PMM Parts	Plunger 4.5" [Rubber Tip]
75210	1	PMM Parts	Power Supply Rev 2
73398	1	PMM Parts	Remote, PMII Big Button
70071	2	PMM Parts	Solenoid - Key, Black
70070	2	PMM Parts	Solenoid - Key, White
70130	1	PMM Parts	Solenoid Assembly, Pedal
70743	1	PMM Parts	Sostenuto Assembly, Universal
76040	1	PMM Parts	Speaker, QRS Amplified
74270D	1	PMM Parts	Trapwork Assembly, Sustain REV D
7921706	1	PNOscan Parts	Cable: 10-Pin 38"
79205	1	PNOscan Parts	Circuit Board, Keyscan
79209	1	PNOscan Parts	Circuit Board, Soft Pedal
79208	1	PNOscan Parts	Circuit Board, Sustain Pedal
79206	1	PNOscan Parts	Coupler, Flex Cable - 6-Pin
7921701	1	PNOscan Parts	Power Adapter, AC/DC - PNOscan TUSB
79210	1	PNOscan Parts	TUSB Interface
79227	1	Spare Parts	Wireless Access Point, PMII - w/Power Adapter and Ethernet Cable
811435	1	Tools	Cable: Test & Alignment Box
70256	1	Tools	Test & Alignment Box
70115	5	Upright Conversion	Bracket, Note Driver Mounting - Upright
70123	8	Upright Conversion	Bracket, Rail Mounting - Upright
70061	90	Upright Conversion	Felt - Lost Motion - Upright
70074	90	Upright Conversion	Foam - Lost Motion

Other Kits

81525	PMII Upgrade Kit		**Package Contents**
	80108		PNOmation II Processor Assembly
		80108A	1 PMII Processor Only
		990026	1 Cable: Speaker [1/8" stereo plug to two RCA]
		70213	1 Cable [6" - RCA M Plug - 2 RCA F Jacks]
		80109	2 Mounting brackets [New - Metal]
		37322	4 Screws: Mounting
	79226		SD Card with the QRS Music Library
	80124		PLx - Pin-Light Port Extender Package
		8012406	1 PLx Unit: Lights, IR Sensor; Stereo & USB Ports; Microphone; Button
		50126	2 Cable: USB A Male to USB 5-Pin Mini B [1 for computer connection to PMII]
		50128	2 Cable: Audio [1/8" Male to 1/8" Male] 6.5'
		50141	1 Cable: USB Male A to USB Male B
		790185B	1 Cable: 72" Six-Pin Ribbon [Black]
		35271	4 Screw
	79232		Portable Wireless Assembly TP-Link TL-WR702N
			Universal USB power adapter (Out: +5V/1A, In:100V~120V)
			Cable: USB
			Cable: RJ45 Ethernet
		50074	Velcro Strip [Use to attach Wi-Fi to beam or back post]
	70204		5 Cable Ties
	30403		1 Screw Driver [Right-Angled Phillips #2 to remove old processor]
	70208		3 Clamp [Wave Shaped Ribbon]
	70585		3 Screws for Clamp [6x1/2"]
	30409		1 Screw Driver [Snub-Nosed Phillips]
	70152		1 Cable: 10' MIDI
	7921706		1 Cable: 10-Pin [Use with 10-Pin Coupler to extend PNOscan cable to PMII]
	8152503		1 Coupler: 10-Pin
	81525i		1 PMII Upgrade Instructions

81529	PMII MIDI Upgrade Kit		Package Contents
	81525		PMII Upgrade Kit - See above
	8152905		PMII Upgrade Kit to PMII MIDI Upgrade Kit Conversion
		70166	2 Adapter: MIDI Barrel Connector
		990026	Cable: Speaker [1/8" stereo plug to two RCA]
		8152501	**Power Adapter** [Power supply for PMII]
		2007116	2 Cable: 6' MIDI
		73398	PMII Big Button Remote
		70388	4 AAA Batteries

Record Option "PNOscan II Key Sensor Strip (Item #79217)
Grand kit w/Record (Item #815006) or Upright kit w/Record (Item #815026)

QRS Remote Control

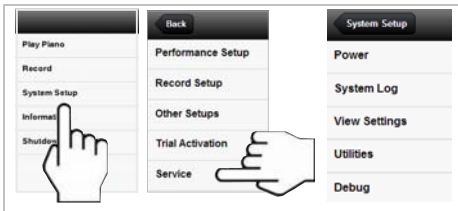
SD	Music Source
Demo	Future Option
PWR	Power ON/OFF
USB	Music Source
MIDI IN	Music Source
P LIST	Future Option
AUD UP / DN	Audio Volume - Offset
MSTR UP / DN	Master Volume - Adjusts Piano and Audio Levels
PNO UP / DN	Piano Volume - Offset
Numbers 0-9	
ENTER	Future Option
◄◄	Previous Song
►	Play Music
►►	Next Song
■	Stop Music
II	Pause Music
REC	Record a Song

SHIFT	Press “SHIFT” and a button below.
RADIO	Future Option
TEST	Test Music Files
D OFF	Future Option
SPDIF	Future Option
AUX	Play Music from an External Source Connected to Audio Port #1
ALIGN	Key Calibration
SET	Future Option
A	Future Option
DYN	Future Option
MUTE AUD	Mute Audio
B	Future Option
MUTE PNO	Mute Piano
ADD	Future Option
COPY	Future Option
INFO	Current IP Address
STAT	Future Option
PSET	Future Option
RESET	Future Option
FUNC	Use with SHIFT and Number Buttons to access Special Features
PGM	Future Option
RAND	Future Option
VOICE	Future Option
PRAC	Future Option

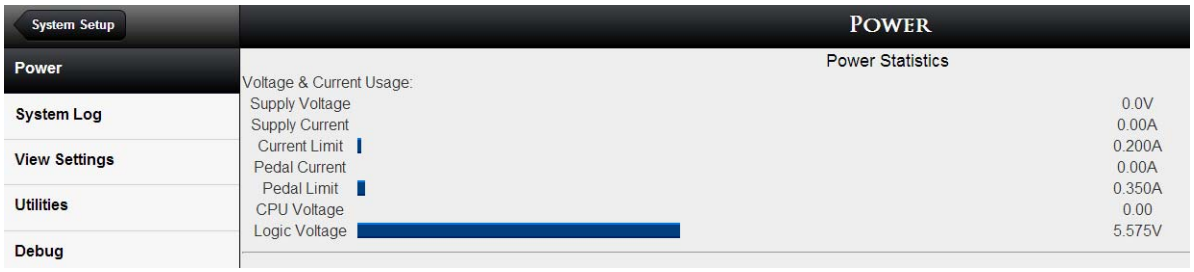
Troubleshooting

Problem	Possible Cause	Remedy
Unit will not turn on	Power cord is not plugged into live socket	Plug line cord into wall outlet
	Wall outlet is not live	Some wall outlets ate controlled by a wall switch
	Power switch on Power Supply is off	Check the main power supply switchn.
	Blown external power supply fuse	Replace the 7amp 250 volt Fast-Blow fuse
	Blown internal power supply fuse	Replace the 5mm 250 volt Slow-Blow 5amp fuse
No music.	Mute is on	Located in volume controls
Key stays depressed	Solenoid misalignment	Loosen the 11/32” solenoid mounting plate nut and align the pusher tip with the center of the key tail
	Bent Solenoid Plunger Push Rod	Replace solenoid plunger
	Magic Pedal Mode	Plug in Pedal Solenoid
Pedal Thumping	Modulation Level	Adjust the “Thump Reduction” setting. System Setup/Pedal Adjust
	Throw distance too great	Decrease pedal throw to 3/16”
Dampers do not fully dampen the strings	Trapwork	Adjust manual sustain rod down to allow dampers to fall to their full rest position Or Adjust pedal solenoid pusher tip upward or clockwise to allow dampers to fall to their full rest position
Solenoid Over-current Message	Shortened Solenoid	Find and replace Solenoid
	Short on Driver board	Find and replace Driver board

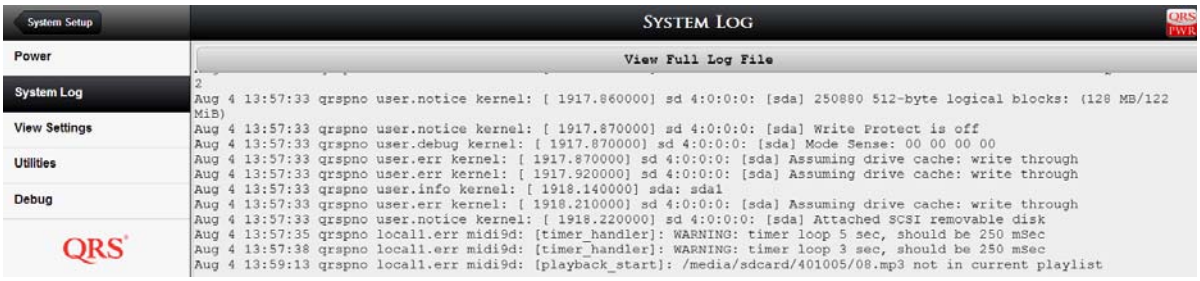
Troubleshooting



Power

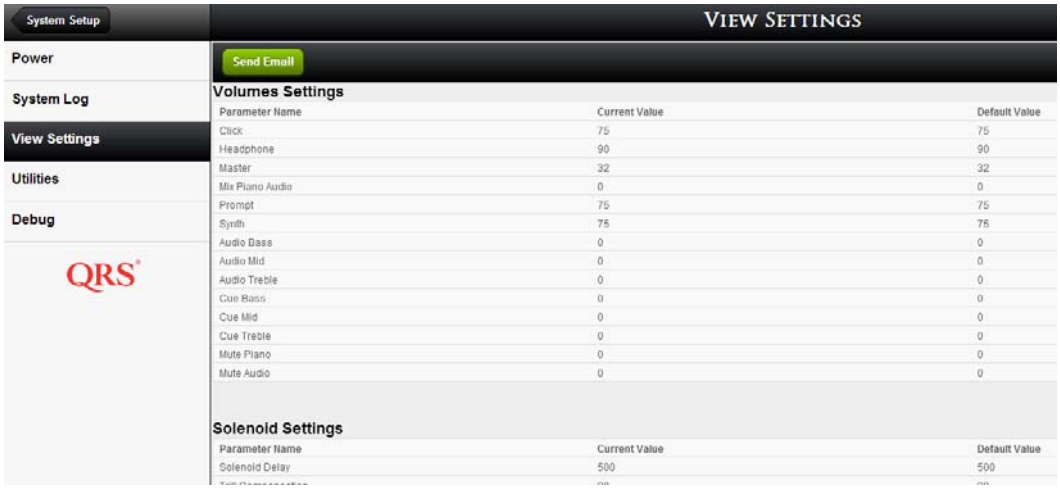


System Log

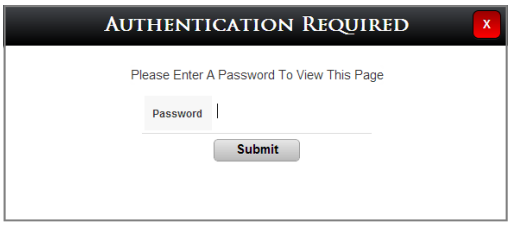

System Setup
Power
System Log
View Settings
Utilities
Debug
QRS
SYSTEM LOG
View Full Log File
Aug 4 13:57:33 qrspno user.notice kernel: [1917.860000] sd 4:0:0:0: [sda] 250880 512-byte logical blocks: (128 MB/122 MiB)
Aug 4 13:57:33 qrspno user.notice kernel: [1917.870000] sd 4:0:0:0: [sda] Write Protect is off
Aug 4 13:57:33 qrspno user.debug kernel: [1917.870000] sd 4:0:0:0: [sda] Mode Sense: 00 00 00 00
Aug 4 13:57:33 qrspno user.err kernel: [1917.870000] sd 4:0:0:0: [sda] Assuming drive cache: write through
Aug 4 13:57:33 qrspno user.err kernel: [1917.920000] sd 4:0:0:0: [sda] Assuming drive cache: write through
Aug 4 13:57:33 qrspno user.info kernel: [1918.140000] sda: sda1
Aug 4 13:57:33 qrspno user.err kernel: [1918.210000] sd 4:0:0:0: [sda] Assuming drive cache: write through
Aug 4 13:57:33 qrspno user.notice kernel: [1918.220000] sd 4:0:0:0: [sda] Attached SCSI removable disk
Aug 4 13:57:35 qrspno local1.err midi9d: [timer_handler]: WARNING: timer loop 5 sec, should be 250 mSec
Aug 4 13:57:38 qrspno local1.err midi9d: [timer_handler]: WARNING: timer loop 3 sec, should be 250 mSec
Aug 4 13:59:13 qrspno local1.err midi9d: [playback_start]: /media/sdcard/401005/08.mp3 not in current playlist

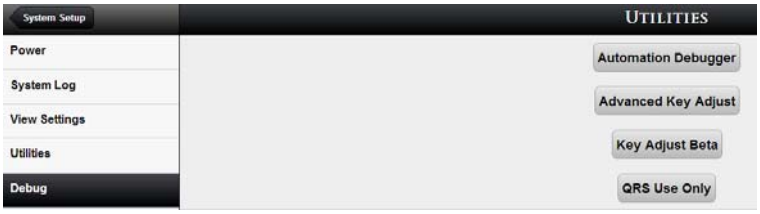
View Settings: Lists the Current and Default Values for the following. items

- Volume
- Solenoid
- Keyboard
- Power Supply
- MIDI
- Network
- DRM
- Pedal
- PNOscan
- Record
- USB Drive
- Velocity Map



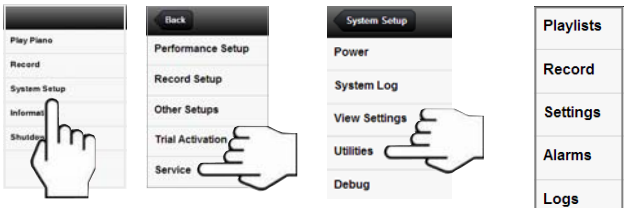
Debug





Troubleshooting

Utilities



Playlists

PLAYLISTS
Playlist Utilities:
Remove All Playlists
Copy All Playlists to USB
Copy All Playlists to SD
Restore All Playlists from USB
Restore All Playlists from SD
WARNING:
Copy will overwrite existing files and Can't be undone.
Remove will delete and can't be undone.
Restore will overwrite existing files.

Record

RECORD
Record Utilities:
Remove All Recordings
Copy All Recordings to USB
Copy All Recordings to SD
Restore All Recordings from USB
Restore All Recordings from SD
WARNING:
Copy will overwrite existing files and Can't be undone.
Remove will delete and can't be undone.
Restore will overwrite existing files.

Settings

SETTINGS
Settings Utilities:
Reset All Settings
Copy All Settings to USB
Copy All Settings to SD
Restore All Settings from USB
Restore All Settings from SD
WARNING:
Copy will overwrite existing files and Can't be undone.
Remove will delete and can't be undone.
Restore will overwrite existing files and restart the system.

Alarms

ON/OFF Scheduling

ALARMS
Alarm Utilities:
Remove All Alarms
Copy All Alarms to USB
Copy All Alarms to SD
Restore All Alarms from USB
Restore All Alarms from SD
WARNING:
Copy will overwrite existing files and Can't be undone.
Remove will delete and can't be undone.
Restore will overwrite existing files.

Logs

Application

Troubleshooting

Testing the system from the PLx box.

When the first light is yellow and the second is green, the system is in standby mode.
The PMII processor is ready but the power to the key solenoids is off.

Press the PLx button once to turn the first light green, which turns on the power to the key solenoids.
Pressing the button now will play the piano.
Pressing the button again will stop play.

If the first two or more lights are yellow, the system has shut down.

Unplug the AC power cord from the wall outlet...
Wait two minutes and then reconnect.

No Music

Shutdown / Unplug from AC wall outlet / Reinsert SD card / Reconnect to power.

PMII Light Patterns and Button Functions

1	2 Blinks / sec	Idle
	Blink	Blinks with MIDI data. Piano should be playing.
2	Solid	Idle
	1 Wink / sec	Indexing Music
	Rapid Blinking	Updating Driver
3	1 Blink / sec	Network Mode = Network with Connection
	Solid	Network Mode = Stand Alone with Connection
	Off	Network Mode = No Connection
	Hold down for just 4 seconds to change Network Mode. Stand Alone Network OFF	
	Hold down for 8 seconds to power OFF PMII. - Tap again to reboot.	

Troubleshooting

Pin-Light Extension [PLx] Light Patterns

PLx Button [Play/Pause/Standby/Reboot] and IR Remote Sensor

Power *Power to Solenoids*	Green	Solid: Power Supply's Hi Light is ON [*Power to Solenoids and Speaker*] Flashing: MIDI Data Detected - *Piano should be playing*	
	Yellow	Solid: Standby: PMII=ON, "Hi" Power=OFF waiting for ON command	
	Red	Solid: Key or Pedal Solenoid Over-Current Shut Down	
System *Power to Electronics*	Green	Solid: Power Supply's "Lo" Power LED is ON, PLx initialized.	
	Yellow	Blinks with QRS Remote Control Activity	
Network	Green	Solid: Stand-Alone Mode [*PMII delivers 192.168.1.1 IP Address*]	
	Yellow	Solid: Network Mode [*PMII gets IP Address from Home Router*]	
	Red	Flashing - PMII is not getting an IP Address or not communicating with Wi-Fi	
Mode Music Source	Green	Solid:	SD Card or USB Drive [*Active after song has been selected*]
		1 Blink:	No SD Card or USB Memory Drive Detected
		2 Blinks:	Record Source [*Active after song has been selected*]
		3 Blinks:	Test Files [*Active after song has been selected*]
	Yellow	1 Blink:	External: Auxiliary Line In
		Solid:	External: QRS Controller
		3 Blinks:	External: MIDI IN 5-Pin
		2 Blinks:	External: MIDI IN USB Client
MIDI MIDI Data to Solenoids	Green	Solid: Keyscan/Primary 10-pin connection to PNOscan II (Record) Flashing: MIDI traffic from record system	
	Red	Solid: No Keyscan/Primary 10-pin connection to PNOscan II (Record) Flashing: 5-pin MIDI traffic	
AMI	Green	Solid: Decoding MIDI Data	
	Yellow	Solid: No MIDI Data detected Flashing: Audio pass-thru [Including Voice Prompts]	

Pin-Light Extension [PLx] Button Functions

Play / Stop	When the 1st light is green… ...press to play the selected song. ...press again to stop playback.	
Standby	Press and Hold for 8 seconds… ...yellow lights will can left… ...release when just the 1st light is yellow.	
Reboot	Press and Hold for 15 seconds… ...yellow lights will scan left then right ...release when the 1st three lights are yellow.	

PNOmation® Electronics/Electromechanical System
Five Year Extended Limited Warranty For The
PNOmation™ Playback Engines Electronics

QRS Music Technologies, Inc. ("QRS") warrants to you for the Warranty Period that there are no defects in the materials of this Product (as identified at the end of this warranty certificate). The "Warranty Period" expires (except as explained below) Five (5) years from the date of your purchase of the Product. In order to determine the date of your purchase of the Product, you will need to provide to us a credit card receipt, a purchase agreement, a sales slip, a warranty registration or some other form of proof that you are the original purchaser and the date of your purchase of the Product.

If you are not able to provide us with some form of proof of purchase date, the Warranty Period will be a shorter period (the "Shorter Warranty Period") which is two years from the date that your dealer purchased the Product from QRS. If you cannot provide a proof of purchase date, you may contact us in the manner described below and we will assist you in determining the date that your dealer purchased the Product from us and determining the Shorter Warranty Period. This is a warranty for parts only and does not include shipping or labor.

This warranty does not apply to any accessories you may have purchased with the Product and does not apply to any piano or components of the piano with which the Product is used or any Piano in which the Product is installed. In addition, this warranty does not cover scratches, dents or other defects in the cosmetic finish of the Product.

The warranty is issued solely to the original purchaser of the Product. THIS WARRANTY IS NOT TRANSFERABLE. If, during the Warranty Period, parts incorporated in this Product are found to be defective in material or workmanship, and the original purchaser provides Purchase Documents to QRS, then QRS or its authorized dealer will provide replacement parts without charge. We may, at our discretion, provide reconditioned parts or assemblies as warranty replacements. You as the original purchaser will be responsible to pay labor costs incurred in connection with any repair.

LIMITATION IN CONNECTION WITH OBSOLETE PRODUCTS

If at the time you make a claim pursuant to this warranty, we no longer manufacture or sell the same model of Product, we may, at our discretion, rather than repair or replace defective parts in the Product, offer to sell you a more current version of a similar Product. If we offer to sell you a more current model of the Product, you will be responsible to pay the difference between the Manufacture's Suggested Retail Price ("MSRP") of the more current version of a similar Product and the price you paid for the Product you purchased. If you choose not to accept such offer, we will have no further obligations pursuant to this warranty.

THIS WARRANTY IS IN LIEU OF ANY OTHER WARRANTY, EXPRESS OR IMPLIED, MADE BY THE MANUFACTURER IN CONNECTION WITH THIS PRODUCT. INCLUDING, BUT NOT LIMITED TO, WARRANTIES OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. TO THE EXTENT ALLOWED BY THE LAW, QRS SHALL NOT BE RESPONSIBLE FOR LOSS OF THE PRODUCT, LOSS OF TIME, INCONVENIENCE, COMMERCIAL LOSS, SPECIAL OR CONSEQUENTIAL DAMAGES, EVEN IF THE MANUFACTURER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

This warranty gives you specific legal rights. Some states provide other rights, and some states do not allow excluding or limiting liability for incidental or consequential damage. Consequently, the limitations and exclusions in this warranty may not apply to you. In addition, some jurisdictions have consumer protection rules, regulations and statutes that may apply to you.

PNOMATION® ELECTRONICS/ELECTROMECHANICAL SYSTEM FIVE YEAR EXTENDED LIMITED WARRANTY FOR THE PNOMATION™ PLAYBACK ENGINES ELECTRONICS

Exclusions

There is no express warranty on the Product and this warranty is void if:

- You did not purchase this Product from an authorized QRS reseller.
- This Product has been serviced, modified or tampered with by anyone other than an QRS Authorized Service Representative
- The name, trademark or serial number has been modified, defaced or removed from the product,
- This Product has been damaged as a result of abuse, abnormal force or strain, failure to reasonably maintain and protect, modification, accident or exposure to extreme temperature or humidity.
- Parts, supplies or other accessories which have not been approved by QRS have been used with this Product.
- Radio frequency interference is generated by uncertified and/or illegal equipment.
- This Product has been moved or delivered without reasonable preparation and packaging or QRS reasonably determines, after inspection that there has been modification of this Product which adversely affects the reliability of the product or component.
- If the system was not installed by a Certified QRS installer the warranty will be the "Shorter Warranty Period".

Owner's Responsibility

In order to have rights under this warranty, you have the following responsibilities:

1. Retain your proof of purchase and purchase date and register your system online at qrsmusic.com or send in your Warranty Registration Card.
2. Notify QRS or any authorized dealer of any warranty claim within ten (10) days after discovery and provide a detailed explanation of the problem.

General

If any provision herein shall be unlawful, void or for any reason unenforceable, then that provision shall be deemed severable from this warranty certificate and shall not affect the validity of and enforceability of the remaining provisions.

QRS reserves the right to make changes in design and/or improvements to its products without any obligation to retrofit products previously manufactured.

INSTRUCTIONS FOR OBTAINING WARRANTY SERVICE

1. If you cannot provide proof of purchase, contact QRS at 800-247-6557 and we will attempt to determine the date on which your dealer purchased the Product and assist you in determining the Shorter Warranty Period. For warranty service, contact the dealer from whom you purchased the product, or your nearest dealer.
2. If no dealer is near you, contact QRS by phone at 800-247-6557.
3. Do not ship the product without prior written Return Authorization from QRS. Do not attempt to repair or disassemble the product yourself.
4. Please record your model number and serial number and your date of purchase below for your records. Keep this information with your proof of purchase in case your product requires service. Do not dispose of the warranty after it expires. In the event your product ever requires service, these instructions should be helpful in enabling you to obtain proper service.

   Product Model #_____

   Product Serial #_____

QRS
SINCE 1900